[redacted]

From: [redacted]
Sent: 05 May 2016 08:20
To: [redacted]
Subject: FW: ETS vs car exhaust

From: [redacted]
Sent: 03 September 2015 13:57
To: [redacted]
Subject: FW: ETS vs car exhaust

Here you are!

And flagged E-lites owned by JTI

From: [redacted]
Sent: 03 September 2015 09:31
To: [redacted]
Subject: RE: ETS vs car exhaust

Thanks [redacted] – on a quick look at the transcript I see the question mentioned outdoor air quality so I will send through some further information today also for circulation and for completeness of evidence

I'm not sure how you select witnesses for Committee hearings but given the strong interest in and subsequent media publicity around smoke-free hospital grounds, I wondered if the Committee may be calling a representative of the clinicians/public health directors who have so fiercely lobbied for entire smoke-free grounds?

I understand that E-lites is being called to give evidence to the Committee next week but I couldn't see a submission from them (I may have missed this) – would you mind sending it through? I presume that the Committee is aware that E-lites is owned by Japan Tobacco International
http://www.tobaccotactics.org/index.php/E-cigarettes
and also that this company has had promotional sponsorship deals with both Rangers and Celtic FCs?

Kind regards

[redacted]

[redacted]
Chief Executive

ASH Scotland
8 Frederick Street
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Tel: 0131 225 4725
Fax: 0131 225 4759
Web: http://www.ashscotland.org.uk

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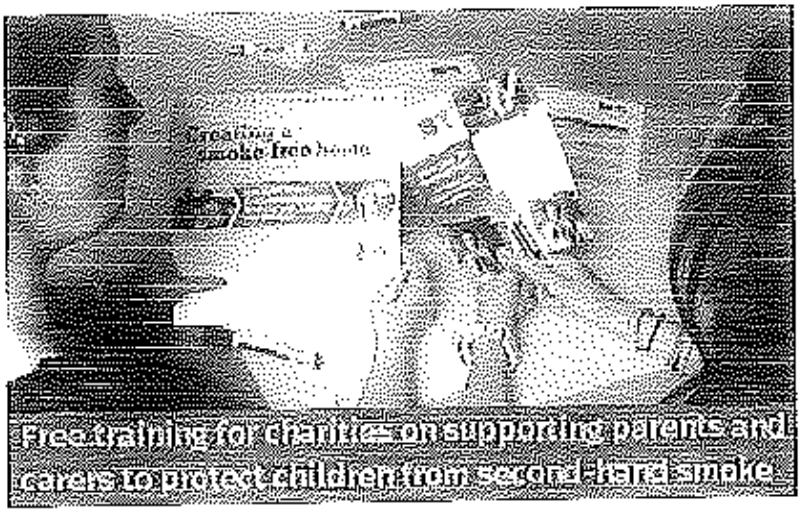

CLICK ON IMAGE FOR MORE INFORMATION

From: [redacted]
Sent: 03 September 2015 08:12
To: [redacted]
Subject: RE: ETS vs car exhaust

[redacted]

Thanks for this, I will circulate it to members.

[redacted]

[redacted]
Health and Sport Committee
Scottish Parliament
Edinburgh, EH99 1SP

Direct Dial: 0131 348 5224
Text Relay: 18001 0131 348 5210
Email: [redacted]

Follow the Committee on Twitter SP_HealthSport

From: [redacted]
Sent: 02 September 2015 16:49
To: [redacted]
Cc: [redacted]
Subject: ETS vs car exhaust

Dear [redacted]

Further to last, please find appended some slides provided by [redacted] with data from smoking homes in Glasgow, Aberdeen and Edinburgh that compare PM2.5 measured inside the home with contemporaneous measurements made at city centre road-side locations.

Kind regards

[redacted]

[redacted]
Chief Executive

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[redacted] ASH Scotland
****

For latest news and information about all aspects of Parliamentary business, MSPs and our work, visit the

[redacted]

From: [redacted]
Sent: 05 May 2016 08:46
To: [redacted]
Subject: FW: The NVP debate briefing
Attachments: NVPschism briefforSG.docx

From: [redacted]
Sent: 03 September 2015 15:31
To: [redacted]
Subject: The NVP debate briefing

Hi [redacted]

Hope this is the sort of thing you were looking for, I've kept it to three pages on the basis that the CMO probably doesn't have much time to digest new information.

[redacted] would be happy to come and speak to the CMO if she would like to have the evidence base unpacked a bit more.

Best wishes

[redacted]
Head of Research Information and Policy Development
ASH Scotland
8 Frederick Street
EDINBURGH
EH2 2HB
0131 220 9480

NVPs – promise or threat?

(electronic nicotine delivery systems – ENDS; nicotine vapour products – NVPs)

'ENDS are the subject of a public health dispute among bona fide tobacco-control advocates that has become more divisive as their use has increased. Whereas some experts welcome ENDS as a pathway to the reduction of tobacco smoking, others characterize them as products that could undermine efforts to denormalize tobacco use. ENDS, therefore, represent an evolving frontier, filled with promise and threat for tobacco control.'

Electronic Nicotine Delivery Systems, WHO report, September 2014[1].

Timeline for recent (selected) pro and anti-disagreements

December 2013

Grana, Benowitz and Glanz evidence review on ENDS for WHO
http://escholarship.org/uc/item/13p2b72n and subsequent paper in Circulation
Grana, R.A., Benowitz, N. and Glantz, S.A. E-cigarettes: A Scientific Review. Circulation 2014:1972-1986. http://circ.ahajournals.org/content/129/19/1972.full.pdf+html
Large and comprehensive review by elder statesman of tobacco control community takes a very precautionary approach to NVPs.

May 2014

Britton and Bogdanovica report for Public Health England
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/311887/Ecigarettes_report.pdf
Tentative welcome for NVPs. In ensuing publicity nicotine is equated with caffeine.

Bates v Chapman....

May 2014

53 'specialists in nicotine science and public health policy' letter to Margaret Chan, Director General WHO http://www.clivebates.com/?p=2185
Argues the case that tobacco harm reduction should be part of the solution, not part of the problem.

June 2014

122 'concerned' experts letter to Margaret Chan. **Says of the specialist letter that '[U]nfortunately the statement makes several assertions about ENDS' marketing, emissions, harms and use that are either contradicted by available evidence or for which no evidence is currently available.'**
http://tobacco.ucsf.edu/sites/tobacco.ucsf.edu/files/u9/Chan-letter-June16%20FINAL%20with%20sigs.pdf

McNeil and Bates v Stanton Glanz.....

4th September 2014
Anne McNeil 'blistering critique' of December 2013 WHO review appears in Addiction, says WHO report misleading.
http://onlinelibrary.wiley.com/doi/10.1111/add.12730/abstract;jsessionid=591B033530D963B1E84C2158D3BE8FAE.f01t04

September 2014
Clive Bates critique of WHO position paper on ENDS. Berates WHO for not taking an objective position to the science.
http://nicotinepolicy.net/documents/briefings/WHOpapercritique.pdf

Glanz v McNeil

September 2014
https://tobacco.ucsf.edu/response-mcneill-et-al-criticism-report-we-prepared-who-and-subsequent-review-paper-circulation-ecigs Glanz doesn't deign to comment but posts someone else's unpicking of McNeil's critique.

Lancet v PHE

August 2015
E-cigarettes: an evidence update. A report commissioned by Public Health England
www.gov.uk/government/uploads/system/uploads/attachment_data/file/457102/Ecigarettes_an_evidence_update_A_report_commissioned_by_Public_Health_England_FINAL.pdf
Clear support for NVPs as cessation aid, fewer caveats than previous report. NVPs 95% less harmful than smoking is widely reported.

Lancet Editorial - E-cigarettes: Public Health England's evidence-based confusion
The Lancet, Volume 386, No. 9996, p829, 29 August 2015
Drafted by Martin McKee and Simon Capewell this queries the 95% safer figure in the PHE report on electronic cigarettes. The primary focus is conflicts of interest amongst the authors of one of the sources for an earlier the risk assessment that the PHE report referenced.
http://thelancet.com/journals/lancet/article/PIIS0140-6736%2815%2900042-2/fulltext

PHE authors reply to Lancet editorial, 31st August:
says read the whole 111 pages before criticising it.
http://thelancet.com/journals/lancet/article/PIIS0140-6736%2815%2900079-3/fulltext

PHE refutation 02 September. PHE says it believes 'the review meets our high standards for scientific rigour and evidence. We are disappointed The Lancet fails to highlight the other important findings in the review, including the worrying shift among smokers toward the inaccurate perception that e-cigarettes are as harmful as smoking tobacco.'
http://thelancet.com/journals/lancet/article/PIIS0140-6736%2815%2900107-5/fulltext

Outstanding questions

Whilst laboratory researchers continue to analyse the constituents of NVP wicks, fluids and aerosols the wider tobacco control community is still debating:

- potential NVP use for cessation and harm reduction among lit-tobacco users
- potential for NVPs maintaining dual use with lit-tobacco where cessation could be an option
- concerns of the dangers of second-hand aerosol (passive vaping)
- increased nicotine dependence among dual users
- long-term use of nicotine; is nicotine as harmless as caffeine? Does the ingestion method make a difference?
- e-cigarettes acting as a gateway to lit-tobacco
- e-cigarettes acting as a gateway for tobacco companies to reach young people
- renormalisation of tobacco use and smoking imagery
- and the effects of unregulated marketing in social and traditional media.

ASH Scotland has not taken a simple for or against position regarding NVPs. We believe they are less harmful than tobacco, but not harmless. We are optimistic that these devices could provide an acceptable alternative to lit, smoked tobacco for some smokers, but we are cautious in particular about how the tobacco industry could seek to use their stake in this market and the potential influence of marketing and promotions at a population level. We believe that many disputes cannot be definitely answered at this stage on current knowledge. For us, the success or failure of these products to be effective in harm reduction turns on the contribution they will make to or against Scotland's vision for a generation free from tobacco. We would be happy to discuss these issues further.

---

[1] World Health Organization report, September 2014, for Conference of the Parties to the WHO Framework Convention on Tobacco Control, Sixth session Moscow, Russian Federation, 13–18 October 2014. Provisional agenda item 4.4.2. FCTC/COP/6/10 Rev.1 1. http://apps.who.int/gb/fctc/PDF/cop6/FCTC_COP6_10Rev1-en.pdf?ua=1

[redacted]

From: [redacted]
Sent: 05 May 2016 09:12
To: [redacted]
Subject: FW: Smoking in grounds

From: [redacted]
Sent: 04 September 2015 13:03
To: [redacted]
Cc: [redacted]
Subject: Smoking in grounds

Hi [redacted]

A number of jurisdictions have legislation prohibiting smoking within a stipulated distance from exits and entrances. In the Australian state of New South Wales, a number of outdoor public places are smoke-free, including public hospitals and health institutions[i]. In Queensland, smoking is prohibited within four metres of entrances to public buildings under the Tobacco and Other Smoking Products Amendment Act 2004[ii] and, smoking is also prohibited within three metres of an entrance or exit to a public building in Tasmania[iii]. Similarly the Canadian provinces of Alberta[iv], British Columbia[v], Nova Scotia[vi] and Northwest Territories[vii] have legislation prohibiting smoking within a specified perimeter of public and work places ranging from 3-5 metres. In the United States, the state of California has banned smoking within 20 feet (6.1m) of the entrance or operable window of a public building. Washington State also has legislation which bans smoking within 25 feet (7.6m) of entrances, exits, windows that open, and ventilation serving an enclosed area where smoking is prohibited.

Contacts

- This is a link to the NSW Govt tobacco control web pages on outdoor smoking restrictions: http://www.health.nsw.gov.au/tobacco/Pages/smoke-free-laws.aspx There is no obvious contact for your kind of enquiry – I understand why civil servants don't want to get besieged – but the Ministry of Health contact details are here: http://www.health.nsw.gov.au/pages/contact.aspx
- Queensland Govt contact info: https://www.qld.gov.au/contact-us/
- Tasmania Dept of Health & Human Services: http://www.dhhs.tas.gov.au/publichealth/tobacco_control/tobacco_control_laws
- For Canada I think your best bet is probably to contact the Propel Center for Population Health at the University of Waterloo and ask them to flag up the relevant civil servants: tobaccoreport@uwaterloo.ca
- For California: CTCPInbox@cdph.ca.gov
- For Washington State, probably someone in the office of the Secretary of the Department of Health - http://www.doh.wa.gov/AboutUs/ProgramsandServices/OfficeoftheSecretary

[redacted] out of the office lecturing respiratory professionals today but she may have academic or fellow ASH contacts to add next week.

Have a good weekend!

[redacted]

[redacted]

From: [redacted]
Sent: 05 May 2016 08:20
To: [redacted]
Subject: FW: Health & Sport Committee survey...?

From: [redacted]
Sent: 07 September 2015 10:43
To: [redacted]
Subject: Health & Sport Committee survey...?

We noticed Scotland on Sunday ran a piece
http://www.scotsman.com/news/health/scots-oppose-ban-on-smoking-outside-hospitals-1-3878910
showing rather casual journalistic investigation and claiming high levels of public opposition for restricting smoking outside hospitals. Simon Clark of FOREST was apparently jubilant in his blog.

The article says that this was based on a 'Scottish Parliament survey' which seems to have been widely circulated by FOREST (I was not aware of its existence). The result suggests that 68% of people completing it were current e-cig users. Not representative of the general population and ... err... what were they hoping to achieve with this kind of survey?

Best wishes

[redacted]

[redacted]
Chief Executive

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Fax: 0131 225 4759
Web: http://www.ashscotland.org.uk

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[redacted]

From: [redacted]
Sent: 05 May 2016 08:19
To: [redacted]
Subject: FW: amended text

From: [redacted]
Sent: 07 September 2015 15:49
To: [redacted]
Subject: amended text

Here is the letter sent to SoS

Sir,

I was disappointed by the lack of balance and rigour in your report on attitudes to smoking in hospital grounds ("Scots oppose ban on smoking outside hospitals" 6th Feb).

That headline referred to figures from an online survey which made no attempt to gather an accurate cross-section of the population. Your article ignored the clear statement in the report that "the survey should not be interpreted as being representative of the population as a whole."

Referring to the views expressed on smoking in hospital grounds, the authors of the report highlighted that "the phrasing of [the question] may have contributed to this negative response as the statement does not specify whether it refers exclusively to smoking cigarettes or includes the smoking of e-cigarettes." This is hugely important given that 68% of the respondents indicated they were current users of electronic cigarettes (more than ten times our estimate of the actual proportion of the population).

ASH Scotland is aware both of the genuine desire amongst NHS Boards to promote health by preventing smoking within any area they are responsible for, and of the problems experienced by some vulnerable people in complying.

That is why we have both supported the Scottish Government's proposal to create a smoke-free perimeter around hospital buildings by law, and said that we would like to see decisions on wider smoke-free spaces being devolved to the local planning system, enabling solutions tailored to the local situation and allowing engagement and consultation with local communities.

Yours,

[redacted]
Chief Executive
ASH Scotland
8 Frederick Street
Edinburgh, EH2 2HB

[redacted]

[redacted]

From: [redacted]
Sent: 05 May 2016 08:19
To: [redacted]
Subject: FW: for letters page

From: [redacted]
Sent: 08 September 2015 10:23
To: [redacted]
Subject: FW: for letters page

[redacted]

For information,

[redacted]

Sir,

[redacted] (Confusion over e-cigarettes, 8 Sept) appears to be entirely confused himself. Let's be very clear on this – the Scottish Government is not consulting on banning e-cigarettes on NHS grounds and has never indicated any interest in doing so. What is being proposed is legislation to stop the smoking of tobacco cigarettes in a designated perimeter around hospital buildings.

The Scottish Parliament website has a clearly marked "bills" section for any researcher wishing to check the basic facts before rushing to print. As head of a tobacco-industry funded group researching "harm reduction" I'm sure [redacted] will want to avoid any further confusion between electronic cigarettes and the tobacco variety.

Yours,

[redacted]
Chief Executive
ASH Scotland
8 Frederick Street
Edinburgh, EH2 2HB

[redacted]
Chief Executive

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[redacted]

From: [redacted]
Sent: 05 May 2016 08:19
To: [redacted]
Subject: FW: for letters page

From: [redacted]
Sent: 08 September 2015 11:49
To: [redacted]
Subject: RE: for letters page

This one was just to the Herald in response to his 'confusion over ecigs piece'. The other was to the Scotsman re his side swipe at plain packs.

I wasn't able to listen to the committee evidence today but I understand there was a big push against placing advertising restrictions, justified mainly by 1. it's a harm reduction option so needs to be marketed as such (TPD may shut some of that kind of advertising down anyway) 2. ASA has it covered (only in retrospect and without effective punishment 3. PHE and [redacted]n letter criticising the WHO report suggest these products need to be advertised by way of harm reduction.

Another miss in the committee's witness profile was not calling a marketing expert [redacted]o remind the committee just why there is such heavy investment in advertising and to remind them what tobacco companies do

Best wishes

[redacted]

From: [redacted]
Sent: 08 September 2015 11:41
To: [redacted]
Subject: RE: for letters page

Can I just ask where this letter went to? Herald as well?

[redacted]
Tobacco Control Team Leader | Public Health Division | Population Health Improvement Directorate | Scottish Government | 0131-244-2576 |
[redacted]

From: [redacted]k]
Sent: 08 September 2015 10:23
To: [redacted]
Subject: FW: for letters page

[redacted]

For information,

[redacted]

Sir,

[redacted] (Confusion over e-cigarettes, 8 Sept) appears to be entirely confused himself. Let's be very clear on this – the Scottish Government is not consulting on banning e-cigarettes on NHS grounds and has never indicated any interest in doing so. What is being proposed is legislation to stop the smoking of tobacco cigarettes in a designated perimeter around hospital buildings.

The Scottish Parliament website has a clearly marked "bills" section for any researcher wishing to check the basic facts before rushing to print. As head of a tobacco-industry funded group researching "harm reduction" I'm sure [redacted] will want to avoid any further confusion between electronic cigarettes and the tobacco variety.

Yours,

[redacted]
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8 Frederick Street
Edinburgh, EH2 2HB

[redacted]
Chief Executive

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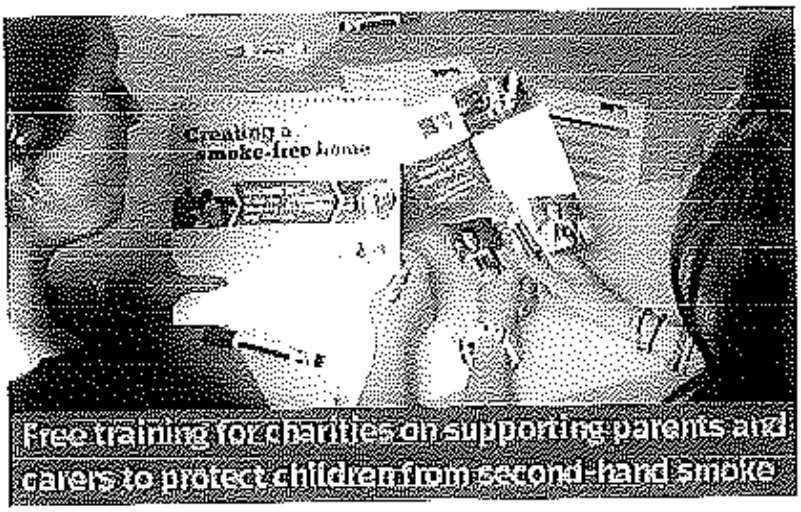

CLICK ON IMAGE FOR MORE INFORMATION

[redacted]

From: [redacted]
Sent: 05 May 2016 08:46
To: [redacted]
Subject: FW: Progression to traditional cigarettes after electronic cigarette use in young people

From: [redacted]
Sent: 09 September 2015 09:14
To: [redacted]
Subject: Progression to traditional cigarettes after electronic cigarette use in young people

Progression to traditional cigarettes after electronic cigarette use in young people

JAMA study getting quite a bit of media coverage today:
http://www.eurekalert.org/pub_releases/2015-09/tjnj-ptt090315.php

I guess this will be of some interest to the CMO, could you pass it on? On a couple of issues (potential gateway, air quality) my feeling is that PHE were too quick to close down arguments that I believe are not yet fully evidenced from research. This piece ties in with my concerns that promotions and marketing could create a gateway from ecigs to tobacco. Just because we are not seeing it yet does not mean it can't happen

Best wishes

[redacted]

[redacted]
Chief Executive

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[redacted]

From: [redacted]
Sent: 05 May 2016 08:45
To: [redacted]
Subject: FW: Another longitudinal study shows that kids at low risk of smoking who use e-cigs are a lot more likely to progress to cigarettes

From: [redacted]
Sent: 09 September 2015 09:19
To: [redacted]
Subject: FW: Another longitudinal study shows that kids at low risk of smoking who use e-cigs are a lot more likely to progress to cigarettes

Further background

From: [redacted]
Sent: 08 September 2015 22:57
To: [redacted]
Subject: Another longitudinal study shows that kids at low risk of smoking who use e-cigs are a lot more likely to progress to cigarettes

[redacted] and his colleagues just published the second longitudinal study demonstrating that adolescents who use e-cigarettes are much more likely to progress to smoking cigarettes than adolescents who do not use e-cigarettes.

Their paper, "Progression to Traditional Cigarette Smoking After Electronic Cigarette Use Among US Adolescents and Young Adults," published in *JAMA Pediatrics*, is especially strong because it is a national study of youth who were at low risk of smoking (called susceptibility) at the beginning of the study when they assessed e-cigarette use.

What they found was that the kids who used e-cigarettes were **8.3 times more likely to be actual smoking cigarettes a year later.**

In addition, among those kids who had not yet started smoking a year later, they were 8.5 times more likely to be susceptible to future smoking. In other words, the use of e-cigarettes moved them along to behavioral continuum towards smoking during the year.

The results in this study are consistent with the longitudinal study of Southern California youth published by Leventhal and colleagues at USC a couple weeks ago as well as our earlier cross-sectional studies and other papers demonstrating that many kids at low risk of smoking cigarettes were initiating nicotine addiction with e-cigarettes.

An accompanying editorial by Jon Klein calls on the FDA (really the Obama Administration) to get off its duff and start regulating e-cigarettes. (We had been told by FDA officials to expect the "deeming" rule in June, now 3 months ago.) The reality is, however, that the FDA's proposed rule would simply assert jurisdiction over e-cigarettes and would not impose any meaningful controls on kid-attracting flavors (which were explicitly left out of the draft rule)

or marketing. Even, if by some miracle, the White House were to allow the FDA to take meaningful action it would be tied up in court anyway.

So, as always, the responsibility to deal with e-cigarettes will remain with local and state governments to include e-cigarettes in clean indoor air laws, educational campaigns, and tax them at levels that will discourage use.

The full paper is here and Klein's commentary is here.

This post is on my blog at http://tobacco.ucsf.edu/another-longitudinal-study-shows-kids-low-risk-smoking-who-use-e-cigs-are-lot-more-likely-progress-cigarettes and @ProfGlantz.

[redacted]

From: [redacted]
Sent: 05 May 2016 08:19
To: [redacted]
Subject: FW: Scottish Parliament petitions committee

From: [redacted]
Sent: 09 September 2015 14:14
To: [redacted]
Cc: [redacted]
Subject: FW: Scottish Parliament petitions committee

Dear [redacted]

This petition is being submitted as I write – will keep you informed how it goes

Best wishes

[redacted]

Petition title: Scottish Parliament meeting standards required by international health treaty

Petition summary: Calling on the Scottish Parliament to develop guidance for all those working in the Parliament, to ensure adherence to obligations under the Framework Convention on Tobacco Control, as set up by the World Health Organisation, and to which the UK is a signatory.

What action have you taken previously to resolve this issue?
In November 2014 we found out that clerks to the Economy, Energy and Tourism Committee had sent committee members information from the Philip Morris tobacco company in advance of one of its meetings. Clerks also printed out and distributed related papers to Members at the meeting itself.

The Philip Morris material made claims of a rise in illicit tobacco and included what seems to us to be a clear attempt to influence members with regard to a proposed public health policy:
"Opponents of the Government's plans for plain packaging say they would further assist the illicit trade by making counterfeiting easier and cheaper, as well as incentivising tobacco smuggling.
Evidence from Australia conducted by KPMG showed a rise in the illicit tobacco market to its highest recorded level following the introduction of plain packaging last year, but the Scottish Government have brazenly ignored its findings."

We were concerned that the opinions of a tobacco company, moving against a government health initiative, should be proactively circulated to members by Committee clerks.
Regardless of the merits or otherwise of the project in question (see http://www.tobaccotactics.org/index.php/Will_O%E2%80%99Reilly) the PMI materials clearly oppose the introduction of a proposed public health measure and back this opposition with misinformation and as such we believe this campaign should not have been aided by Parliament officials.

We wrote to the Convenor of the Standards Committee asking that Parliament officials be informed of the obligations imposed by the Framework Convention on Tobacco Control, but received a reply indicating that the matter would be left to individual committees.

This week the Health and Sport Committee had the "Head of Corporate Affairs and Communications" for Japan Tobacco International as a witness at its meeting of 8th September 2015. His presence related to an evidence submission from E-Lites, an electronic cigarette company owned by Japan Tobacco. The E-Lites submission is included in the Committee papers and appears to be presented as that of an e-cigarette company with no interest in commenting on proposed tobacco measures, as for example:

"Since the definitions of "smoke" and "no-smoking premises" in the Smoking, Health and Social Care (Scotland) Act 2005 very clearly exclude vaping products (with and without nicotine), this does not fall within our remit."

For a senior tobacco industry representative to give evidence to a Parliamentary Committee on a submission which claims to not relate to smoking raises serious concerns over the Framework Convention obligations regarding transparency, and the witness did take the opportunity to comment on smoke-free hospital grounds proposals.

We believe that no guidance regarding the Committee's obligations under the Framework Convention on Tobacco Control was provided to the Health and Sport Committee members and would question how the Members and clerks can operate within the obligations of the Convention without good information as to what is required of them.

We appreciate that the Scottish Parliament is marked by its willingness to be open to all stakeholders, and accept that materials originating with tobacco companies can and will still form a legitimate part of scrutiny and debate in Parliamentary Committees. However there are parameters and checks that should be put in place for the Scottish Parliament to be able to demonstrate good governance in this matter and compliance with Scotland's international treaty obligations.

Petition Background Information

The Framework Convention on Tobacco Control was set up by the World Health Organisation. The UK is one of the 180 parties to the FCTC (see http://www.who.int/fctc/en/). Recognising the tobacco industry's long history of interference in legitimate public health policies (http://www.bath.ac.uk/ipr/policy-briefs/tobacco-companies-undermining-health-policy.html), Article 5.3 of the Convention sets out strict parameters on engagement with the tobacco industry.

The FCTC does not prohibit parties from engagement with the tobacco industry but recognises that the interests of the industry are in direct conflict with the goals of public health, and therefore sets strict guidelines around any interaction:

- Parties to the Convention should protect their public health policies from commercial and other vested interests of the tobacco industry
- Parties should interact with the tobacco industry only when and to the extent strictly necessary to enable them to effectively regulate the tobacco industry and tobacco products.
- Parties should ensure that any interaction with the tobacco industry on matters related to matters related to tobacco control or public health is accountable and transparent.

Scotland's tobacco control strategy includes a commitment to carry out an audit of the implementation of Article 5.3 of the Framework Convention.

Signatories:

[redacted] – President, Royal College of Physicians Edinburgh
[redacted] – Chair, British Medical Association Scotland
[redacted] – Chair, Royal College of Psychiatrists in Scotland
[redacted] – Chief Executive, ASH Scotland
[redacted] – Chair, Lothian Branch Royal College of Nursing
[redacted] – Head of British Lung Foundation Scotland and Northern Ireland

[redacted] – Senior Public Affairs Manager, Cancer Research UK
[redacted] - Former Medical Director, Beatson West of Scotland Cancer Centre (retired)

[redacted]
Chief Executive

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CLICK ON IMAGE FOR MORE INFORMATION

[redacted]

From: [redacted]
Sent: 05 May 2016 08:45
To: [redacted]
Subject: FW: e-cig advertising images
Attachments: 1.jpg; 2.jpg; 3.png; 4.jpg; 5.jpg

From: [redacted]
Sent: 16 September 2015 15:47
To: [redacted]
Subject: e-cig advertising images

Images shared with me by [redacted] showing some of the things various ecigs manufacturers (including some of our own dear Imperial and JTI owned brands) get up to elsewhere in terms of advertising.

Also,
https://www.cdph.ca.gov/programs/tobacco/Documents/Media/State%20Health-e-cig%20report.pdf
an interesting perspective on NVPs from California State Health Office. From exec summary:

Harm Reduction Claims and Myths
- There is no scientific evidence that e-cigarettes help smokers successfully quit traditional cigarettes.
- E-cigarette users are no more likely to quit than regular smokers, with one study finding 89 percent of e-cigarette users still using them one year later.

Another study found that e-cigarette users are a third less likely to quit cigarettes.

Unrestricted Marketing
- In three years, the amount of money spent on advertising e-cigarettes increased more than 1,200 percent.
- E-cigarette advertisements (ads) are on television (TV) and radio where tobacco ads were banned more than 40 years ago. Most of the methods being used today by e-cigarette companies were used long ago by tobacco companies to market traditional cigarettes to kids.
- Many ads state that e-cigarettes are a way to get around smoking bans, which undermines smoke free social norms. Various tactics and claims are also used to imply that these products are safe.
- The fact that e-cigarettes contain nicotine, which is highly addictive, is not typically included in e-cigarette advertising.

Best wishes

[redacted]
Chief Executive

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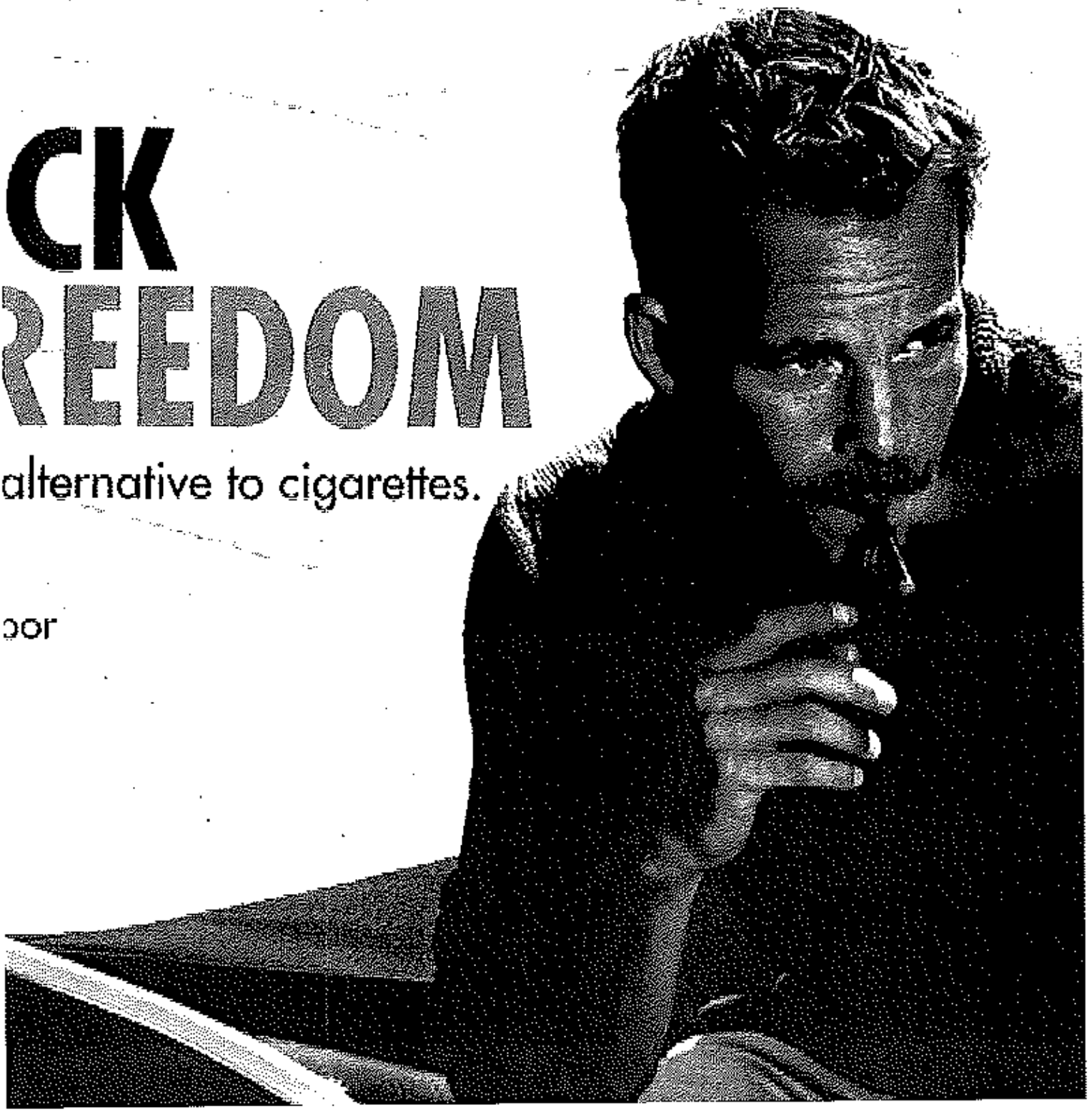
ASH Scotland's vision is of a healthier Scotland, free from the harm and inequality caused by tobacco.

CK

REEDOM

alternative to cigarettes.



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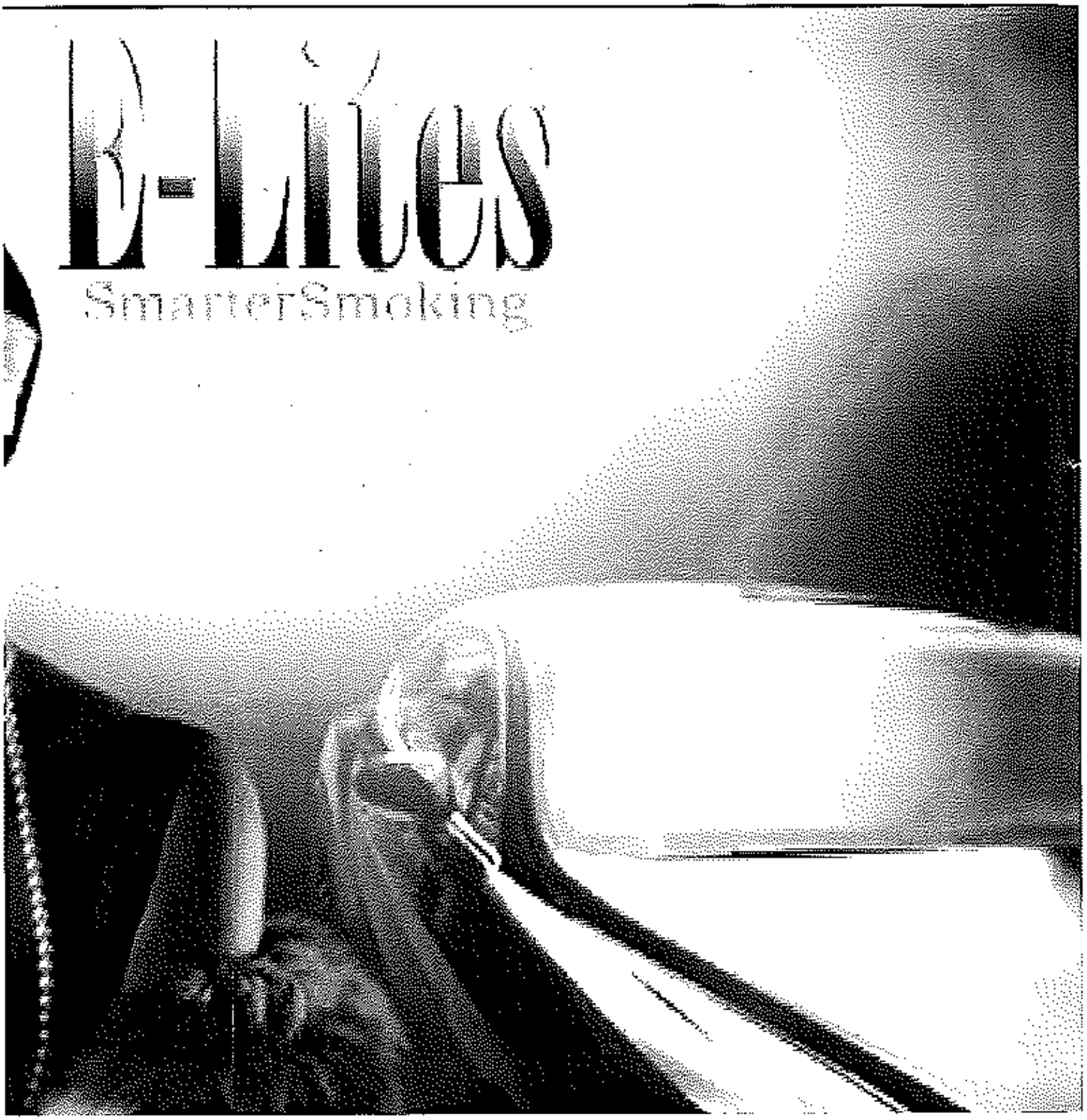

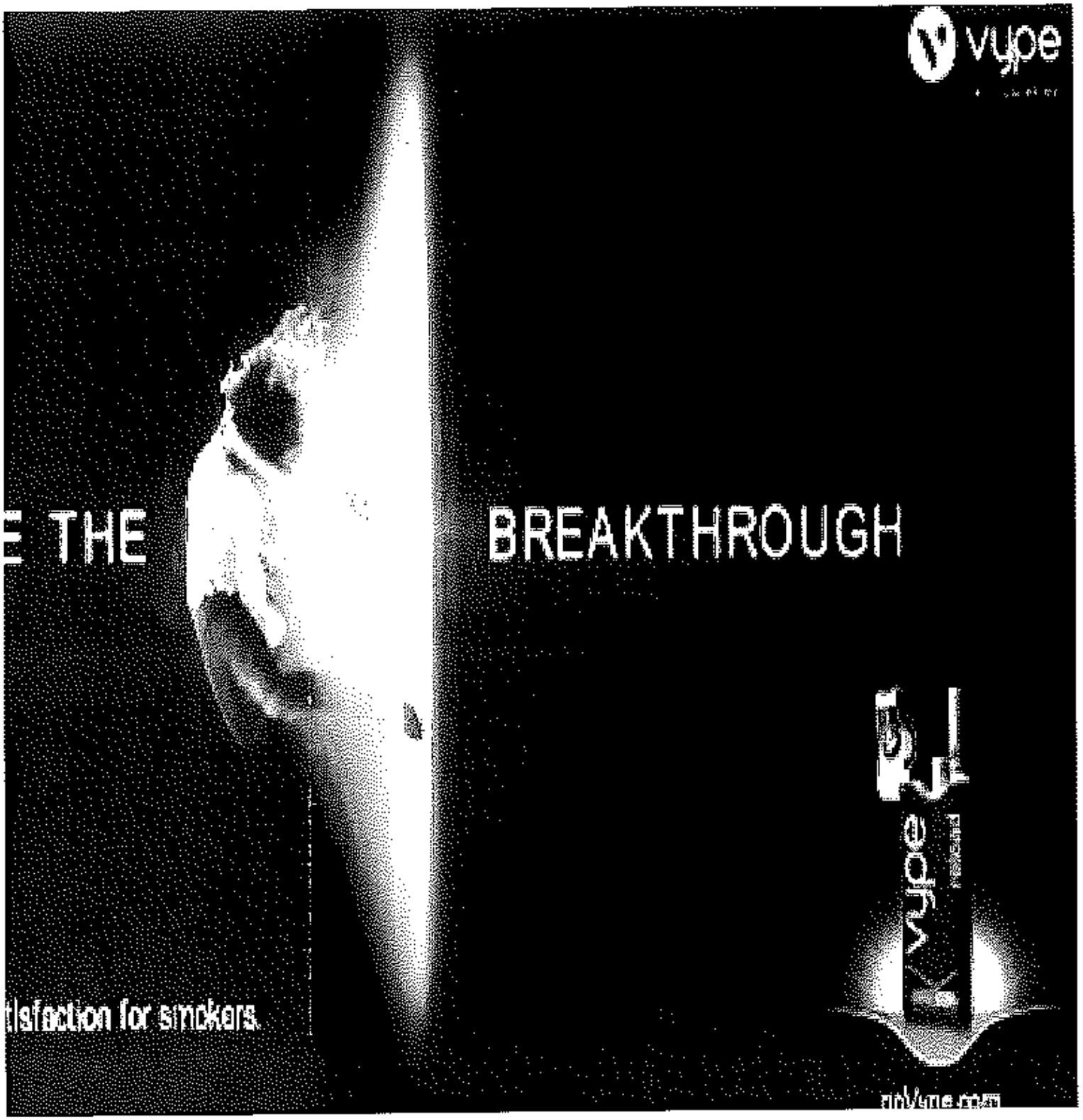
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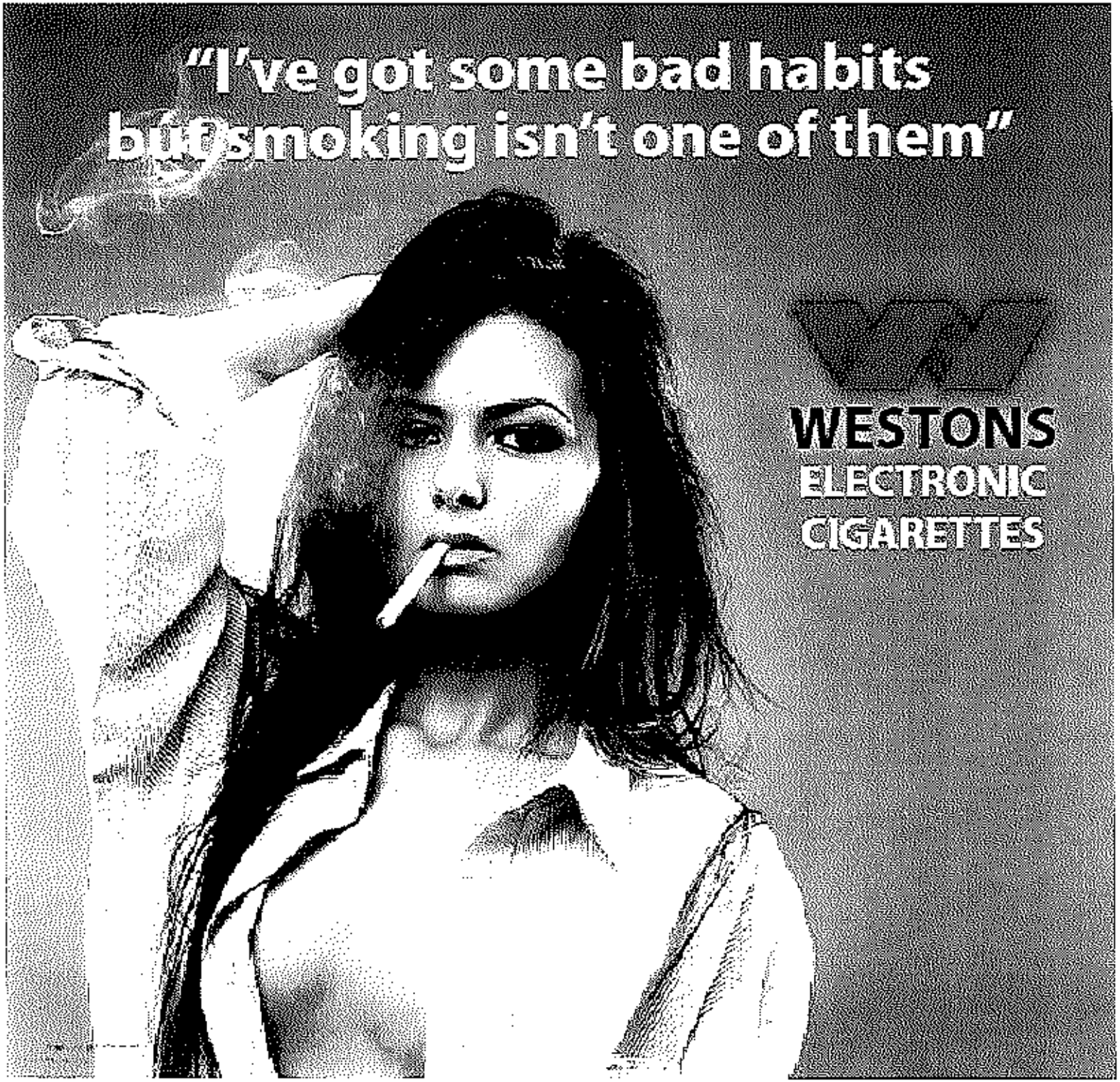
"I've got some bad habits
but smoking isn't one of them"
WESTONS
ELECTRONIC
CIGARETTES


DEAR SMOKING BAN,

[redacted]

From: [redacted]
Sent: 05 May 2016 08:21
To: [redacted]
Subject: FW: questions

From: [redacted]
Sent: 11 September 2015 16:00
To: [redacted]
Cc: [redacted]
Subject: RE: questions

Dear [redacted]

Singapore:

The organization TFG Singapore has a proposal for a law. TFG Singapore is focused on creating a social movement towards a tobacco free generation. I'd send you a link but their website has been hacked

As an aside I notice that Singapore's environmental agency has in its guidance on smoke-free spaces
'We also encourage non-smokers to be gracious when they see smokers lighting up in a prohibited area, reminding them gently that smoking is banned and requesting them to finish their cigarette elsewhere. Together, we can make Singapore a cleaner and healthier place for all to live in.' I like the idea of exhorting people to be gracious.

Tasmania:

The Tobacco-free generation amendment to the health act has been introduced to the Tasmanian Parliament but is being heavily lobbied against (usual suspects) and has yet to be passed:
http://www.smokefreetasmania.com/new-law/ - bill timetable here:
http://www.parliament.tas.gov.au/bills/40_of_2014.htm

Forbidden fruit:

US Prohibition in the 1920s would have been a lovely case study but there's a lack of consensus about its legacy and what can be learned from it:
Blocker, J S. Did Prohibition Really Work? Alcohol Prohibition as a Public Health Innovation
Am J Public Health. 2006 February; 96(2): 233–243.

I've done a PubMed trawl, and a grey lit search and there's nothing which would count as evidence.

UK smoking rates:

Yes, smoking rates lowest in UK since records began in the 1940s based on ONS figures for adults across UK,

Have to be a bit more cautious about youth smoking rates because
1)it is self-reported cigarette smoking data, which may underestimate true prevalence by around half,
2) and the four countries aren't comparable because of the differences in data collection.

so the answer is probably for the other parts of the UK ...and certainly on reported figures (SALSUS) for Scotland

Best wishes

[redacted]

Head of Research Information and Policy Development
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8 Frederick Street
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0131 220 9480

From: [redacted]
Sent: 10 September 2015 12:31
To: [redacted]
Cc: [redacted]
Subject: questions

[redacted]

A couple of random questions that I wondered if you could help with.

Smoke-free Singapore and Tasmania – the approach promoted in these jurisdictions to banning the sale of tobacco to anyone born after a certain date – is this law? I don't think it is in Tasmania but not sure for Singapore?

Forbidden Fruit – we've not had tomatoes yet but we've had donuts and fruit of the forbidden kind. Is there any evidence that restricting certain products increases uptake? You could say that across the UK, many tobacco control measures have been implemented over the last decade but we haven't seen a rise in uptake of tobacco products – indeed adult and young people smoking rates are at the lowest since records began (if I have that right for all of the UK)?

[redacted]

[redacted]
Tobacco Control Team Leader | Public Health Division | Population Health Improvement Directorate | Scottish Government | 0131-244-2576 |
[redacted]

[redacted]

From: [redacted]
Sent: 05 May 2016 08:45
To: [redacted]
Subject: FW: e-cigs market share and tobacco companies

From: [redacted]
Sent: 18 September 2015 10:49
To: [redacted]
Cc: [redacted]
Subject: RE: e-cigs market share and tobacco companies

The answer I received on this was

It's the most comprehensive data Wells Fargo has published - they refer to it as 'all channel' data (as opposed to their info from
Convenience stores only)

But that it would be necessary to go back to the original report to check detail re channels

I hope that helps

Best wishes

[redacted]

From: [redacted]
Sent: 17 September 2015 16:20
To: [redacted]
Cc: [redacted]
Subject: RE: e-cigs market share and tobacco companies

Dear [redacted],

This is really interesting and reaffirms our sense ('sense' in the absence of reliable, up-to-date UK data) that the market is dominated now by TI-owned brands, which, I suspect, was almost an inevitability from some time ago.

Do you know how complete the Wells Fargo data are, especially whether they include online sales?

Thanks,

[redacted] Population Health Analysis | Health Analytical Services | The Scottish Government | Tel: 0131 244 5074 | [redacted]

From: [redacted]
Sent: 17 September 2015 15:53
To: [redacted]

Cc: [redacted]
Subject: e-cigs market share and tobacco companies

Dear [redacted]

I went to Bath University researchers for what is known on the most up to date data on e-cigs market share. They haven't seen any specific company market share data for the UK e-cigarette market, although like us they have noted the distribution deals undertaken by Boots (Imperial Tobacco e-cig) and Lloyds Pharmacy (BAT e-cig).

However they note that US data tells an interesting, and important, story. The US has the largest e-cigarette market globally, followed closely by Western Europe (in particular UK and France).

Here is their most recent company market share data:

US e-cigarette market 2015

Market share (%)	Company	Brand
35.7	Reynolds American	Vuse
22.7	Lorillard/ Imperial	Blu
13.8	Logic/ JTI	Logic Pro
6.1	Altria	MarkTEN, Green Smoke
4	NJOY	NJOY
17.7	Other	Mistic, etc

Source: Wells Fargo Equity Research. Nielsen: Tobacco "All Channel" Data. Cig Pricing Remains Strong –E-Cig Growth Continues to Reaccelerate. 26 May 2015

Importantly, **78% of US e-cig market is currently controlled by tobacco interests.** This is very different from only 2 years ago when the market was still fragmented with small to medium sized e-cigarette companies. The last year has seen strong market consolidation, dominated by large tobacco companies buying out smaller e-cigarette companies, and throwing their money behind large-scale marketing campaigns to build market share. It is not unreasonable to project that this development will also occur in the UK e-cigarette market, if it has not done so already.

The idea that only a limited number of brands are owned by tobacco companies does not seem to hold any longer either.

Below is a an image from market research company Euromonitor International, which shows the e-cig brands now owned by tobacco companies.

Tobacco players and their vapour brands (2014)

Source: Zora Milenkovic. Imperial Propelled to Top of E-cigarettes Tree With Surprise Acquisition of blu in Reynolds/Lorillard Divesture. Euromonitor International, 16 July 2014

A significant number of these brands are available on the UK market (Nicolites,Vype, Blu, Elites for example), and as previously mentioned some of them have distribution agreements with leading UK pharmacies. Much of the advertising we currently see is for brands owned by the tobacco industry.

Kind regards

[redacted]

[redacted]
Chief Executive

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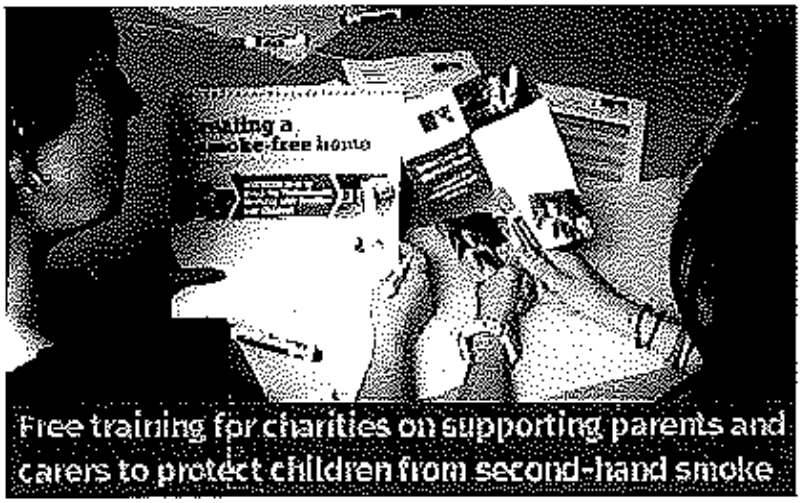
ASH Scotland's vision is of a healthier Scotland, free from the harm and inequality caused by tobacco.



[redacted]

From: [redacted]
Sent: 05 May 2016 08:22
To: [redacted]
Subject: FW: education program evidence
Attachments: Effectiveinterventionsforspeedingmotorists.pdf

From: [redacted]
Sent: 29 September 2015 11:27
To: [redacted]
Cc: [redacted]
Subject: RE: education program evidence

Dear [redacted]

If, as currently proposed, the driver of a car be made vicariously liable then there's a real possibility you'll have non-smoking drivers being fined so education courses as alternatives to fines could include components such as:

- impact of smoking behaviour on the individual (drivers and passengers smoking in the car when children present)
- impact of second-hand smoke on children (non-smoking drivers and smoking passengers)

A standard level of delivery would have to be decided, as would whether training should be delivered in classes or on a face to face basis, but most smoking cessation services would be able to deliver a pre-defined module and the services have a good geographic spread, and something like the 'take it outside' training could be modified to focus on cars.

For rural/remote access
there are plenty of international examples of these courses being delivered online/by Skype – eg: http://www.myduiclass.com/ , https://www.northmetrotrafficschool.com/ ; http://alcoholdrugsos.com/index.php?option=com_content&view=article&id=1&Itemid=9 although some thought, as with the face to face courses, would have to be given about how to interface with the justice system. Health Scotland has a good track record on elearing modules so the main cost would be the module development and the justice system interface.

Most alternatives to fines/points on licence cost as much (sometimes more) than the fine so a smoking cessation/shs awareness course in Scotland would have to be free/cost substantially less. (proposed fines not exceeding £200, £500, and £1000k on standard scale levels 1-3; fixed penalty £50 for England and Wales) or it might have a 'disproportionate impact' on 'people in deprived communities' as suggested in the Stage 1 report.

1) **Were education programmes discussed as a possible amendment to the legislation in England**
   I've asked someone in the Department of Health if he knows. Request put in on Thursday evening – I'll report back if/when he replies, and I've asked colleagues in London too. The deafening silence suggests that no-one remembers this happening and I certainly couldn't find any information about it.

2) **deterrent effect of being referred to an education program compared to a fine**

   England & Wales – Under the **national Driver Offender Retraining Scheme (DORS)** drivers may get the chance to buy a place on a speed awareness course. No fine, no penalty points – but half a day of classroom coaching.

Speed Awareness Courses: 953,428 motorists accepted and attended a speed awareness course in 2013. This was almost double the 2010 figure of 500,000 motorists taking up such a course. **There was a 2011 evaluation** which claims (*for this is an evaluation and not definitive research*) to show that:
- The results provide evidence that the National Speed Awareness Course produces changes in key psychological predictors of speeding, namely instrumental and affective attitudes, moral norms, self-efficacy and intentions.
- The course was effective in changing affective attitudes – after the course, participants believed they would gain less enjoyment from speeding.
- After the course, positive attitudes towards speeding decreased and negative attitudes increased.
- A total of 99% of clients who responded at follow-up reported that they had changed their driving after attending the course, notably driving more slowly, being more aware of the road environment and of their speed, and feeling less stressed while driving.
http://www.roadsafe.com/pool/files/SpeedAwarenessResearch%5B1%5D.pdf

There is also a study (conducted without a control group though) done by Aston University of which the lead author said: "*The results clearly show that the speed awareness course led to reliable improvements in client's attitude to speeding and importantly their intention not to break the speed limit. The benefit of the course occurred immediately and persisted several weeks after course delivery. The speed awareness course led to very reliable improvements in clients' attitude towards not speeding.*" Oddly I can't find the published report, although the presentation is available to view on Youtube
http://www.safespeed.org.uk/forum/viewtopic.php?f=5&t=26323&view=next

and of course the money raised from charging the speeders to do the courses doesn't go to the Treasury (like a fine would) it goes to the individual safety camera partnerships and they use it to buy more speed cameras – so it seems profitable.
http://www.telegraph.co.uk/motoring/news/9713854/Soaring-speed-awareness-courses-paying-for-new-cameras.html

There is also a wider National Driver Offender Retraining Scheme (NDORS)
http://www.hartlepool.gov.uk/info/100011/transport_and_streets/1462/national_driver_offender_retraining_scheme_ndors/2

Other courses include:
Speed Awareness Workshop - Urban Roads: for drivers who have been caught doing between 35-39mph in a 30mph zone and 46-50mph in a 40mph zone. Classroom based the course lasts two and a half hours and costs £74 which is paid instead of the £60 fine and three penalty points.
Speed Awareness Workshop - Faster Roads: for driver's detected doing between 57-61mph in a 50mph zone, between 68-72mph in a 60mph and between 79-83mph in a 70mph. The course is classroom based, lasts two and a half hours and costs £74, which is paid instead of the £60 fine and three penalty points.
Red Light Camera Course: for drivers who have been caught Going Through a Red Light, this half-day theory based course runs for 3.5 hours. Those eligible will be contacted by the police once they have had their Notice of Intended Prosecution (NIP) and by agreeing to attend the course they agree to participate and successfully complete the course which includes:

Several police authorities also operate workshops designed for people who have been caught out **using their mobile phone while driving.** The penalty for using a mobile phone while driving is three penalty points on your license, a fine of £60 - £1000 for private car drivers. Drivers can opt to take the workshop as an alternative to the both fine and the points eg 'Call Divert'
http://www.theaa.com/aadrivetech/driver-awareness/call-divert-course.html ; 'What's driving us'
http://www.thamesvalley.police.uk/rdsafe-roadpol-education-whats-driving-us.htm

From 1 January 2000, courts throughout England, Wales and Scotland have had an extra sentencing option for drink/drive offenders - **Drink-drive rehabilitation workshops** – there only seem to be a few in selected parts of Scotland.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/461785/drink-drive-

rehabilitation-scheme-annex-a.pdf

There's a large and very solid EU research project DRUID (Driving under the influence of Drugs, Alcohol and Medicines) which deals with rehabilitation of substance impaired drivers. The overall aim of this was to increase knowledge and to elaborate Europe-wide standards for intervention measures for drivers under the influence of alcohol (DUI) or illicit drugs (DUID). http://www.bast.de/Druid/EN/deliverales-list/downloads/Deliverable_5_1_1.pdf?__blob=publicationFile (359 pages long).

Australia has cannabis intervention sessions as an alternative to fines
http://www.dao.health.wa.gov.au/Informationandresources/WADiversionProgram/CannabisInterventionSession.aspx

3) **success of education programs when used in place of a fine – in terms of changing behaviour / reducing repeat offences**
see above. Also see p77 onwards of the Department of Transport report I've attached

some work on this in Australia, see The NSW Sober Driver Program (SDP): Recidivism rates and program parameters, which found that SDP participants were 44
per cent less likely to re-offend than the comparison group -
http://casr.adelaide.edu.au/rsr/RSR2011/6EPaper%20188%20Mazurski.pdf

4) any examples of where such an approach is used / had been evaluated and associated costs
Other than the above I can't find a nice clean 'if we wanted to do this how much would it cost' evaluation. It looks to me as though, where offered as alternatives to fines, points or indeed custody, these courses are put out to tender – to companies like this: http://www.ttc-uk.com/aboutus/ . The fact that some speed awareness courses are now financing additional speed cameras suggests they are quite profitable.

Supplementary:
I know we've mentioned this before but perhaps worth reminding the Minister to remind the Scottish Parliament....Evidence suggests that educational campaigns in this area are most effective in changing behaviour **when accompanied by legislation.** Efforts to encourage seatbelt use in cars were most successful when legislation was introduced. Seatbelt wearing rates increased in the UK from 25% to 91% after legislation was introduced alongside awareness campaigns.
Seat-belts and child restraints. World Health Organisation/ FIA Foundation, 2009
Table 1.5, p21. http://www.who.int/roadsafety/projects/manuals/seatbelt/seat_belt_manual_module_1.pdf?ua=1

Happy to investigate this more, just let me know.

Best wishes

[redacted]
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Department for
Transport

Road Safety Research Report No. 66

Effective Interventions for Speeding Motorists

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Brainbox Research Ltd

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Dr Rebecca Lawton
University of Leeds

March 2006

Department for Transport: London

Although this report was commissioned by the Department for Transport, the findings and recommendations are those of the authors and do not necessarily represent the views of the DfT.

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CONTENTS

EXECUTIVE SUMMARY

This report summarises the results of research undertaken by two independent research groups (Brainbox Research and the University of Leeds) into the components of interventions that are most likely to change speeding driver behaviour (part one). The parallel nature of the work by these two groups has led to partially overlapping conclusions, which are noted in this joint report. Part two reports the discussions and consensus of an expert group meeting of scientists and stakeholders at which the research was presented. The outcome of this meeting was a list of components that national speed awareness schemes should include, and how such schemes should be evaluated.

Chapter 1 of the report provides an overview of the seven main models that have been used to predict and modify health-related behaviour. The ways in which each of these models assumes speed choice is determined are discussed, and the predictive power of components of the models compared. The review of the models suggests that the strongest predictors of behaviour are intentions, attitudes, perceived behavioural control and self-efficacy. However, the models do not indicate which of these constructs are more amenable to change, so that even though intention to drive within the speed limit would be the greatest predictor of not speeding, it may be difficult to change intention directly, and the other predictors, although having less predictive power, may be easier to change.

Chapter 2 presents a literature review of the social cognitive predictors of speeding. The aim was to investigate the relationship between psychological theoretical models, speeding intentions and behaviour. The review considered attitudes, perceived control, anticipated regret, intention, influence of others, perceived risks, personality and affect. The review provides evidence that social cognitive components predict speeding, and that the perceived benefits of speeding may be as important as the perceived risks. The papers reviewed also point to the need to distinguish between the majority of drivers for whom speeding is moderate and those who adopt speeds that are considerably higher than the norm. This second group of drivers appear to be those who are least deterred by speed cameras and for whom the negative consequences associated with speeding may be least important. They may also be a group of drivers who engage in other risky driving practices (e.g. dangerous overtaking), and these drivers may ignore anti-speeding messages either because they do not think they are targeted at them or because they adopt strategies (e.g. risk-mitigating beliefs) that reinforce their speeding. The findings suggest that whilst road safety campaigns containing risk information and speed enforcement strategies may be useful in deterring drivers, en masse, from speeding and in maintaining current average speeds on roads in the UK, these same strategies may be ineffective in tackling the worst offenders. Indeed, for this group of drivers, the benefits associated with driving fast – perhaps the thrill, excitement and social kudos that speeding generates – may be sufficient to maintain the behaviour despite

the threat of negative consequences. Different forms of interventions may be necessary for this group.

Chapter 3 reports a broader review of the literature on drivers' choice of speed. This had the aim of identifying different sub-groups of speeding drivers. Five psychological factors that influence the speed at which drivers travel were identified:

- attitudes and appraisals;
- perceived normal behaviour and values;
- personality;
- self-identity; and
- intention.

The evidence base supports the existence of four different sub-types of speeding drivers. Unintentional speeders are those who are not aware of the correct speed limit, or who speed because of a lapse of attention, or because they underestimate their speed. Moderate occasional speeders consider themselves to be safe and skilled, and exceed the limit by a level they believe to be relatively low. They do not identify themselves as a speeding driver and they speed less frequently than high speeders. They do not tend to experience pleasure from speeding and they do not generally violate traffic rules. Frequent high speeders are aware that they drive faster than average, and while they may acknowledge that this represents an increased risk, they nevertheless believe they are safe. They have a higher intention to speed and a more positive attitude to speeding than low speeders, and they tend to speed more frequently and experience more pleasure and emotional outlet from driving. These drivers take more risks and report more general accidents or violations. They are usually more experienced drivers and more likely to be men. Their high-speed driving may be restricted to certain circumstances, such as a motorway. Socially deviant drivers acknowledge that their behaviour is dangerous, and they enjoy taking risks and breaking rules. They are more likely to engage in dangerous driving and more general law-breaking, and they score higher on personality measures of psychoticism, thrill, adventure seeking and boredom, and lower on neuroticism. These drivers are more likely to be young, and to engage in more risky behaviour and violations in general. Identifying the type of speeding driver is likely to be problematic when only the observed speed is noted; more information on the individual speeding driver is generally needed.

Chapter 4 reports the results of two independent reviews on effective interventions to change risky behaviour conducted by the University of Leeds and Brainbox. The reviews reached markedly similar conclusions, and provide evidence that effective interventions should target:

- attitudes (beliefs and values) towards speeding;

- beliefs about the acceptability and ubiquity of speeding;
- the driver's responsibility for their own speed choice;
- perceptions of the likelihood of being detected;
- perceptions of the benefits of speeding and the negative consequences of being caught or of crashing;
- perceived barriers to driving at an appropriate speed;
- the way in which speeding makes drivers feel;
- drivers' perceptions of their ability to drive at an appropriate speed; and
- when and where drivers will reduce their speed.

Persuasive messages should be paired with strategies that promote elaboration (e.g. group discussion), and there should be interactive problem-solving sessions to help individuals identify and adhere to appropriate speeds. For example, interventions might be designed to:

- undermine the perception that speeding is associated with benefits;
- promote the idea that there are costs, other than crashing, associated with speeding;
- promote the idea that drivers have control over the speed they adopt and that barriers to driving slowly are easy to overcome;
- undermine the effect of normative pressure on driving fast; and
- promote the affective benefits of driving more slowly.

The reviews indicate that self-efficacy (and perceived behavioural control) may be a particularly important target because of its strong association with behaviour and the fact that there is good evidence about how to intervene effectively. Persuasive messages should be paired with strategies that promote elaboration (e.g. group discussion), and there should be interactive sessions on joint problem-solving to help individuals identify and adhere to appropriate speeds. Drivers should be reminded that speeding is illegal. Reminders of key messages should be sent to drivers some months after the course. Interventions developed to change the speeding behaviour of the worst offenders may need to be different from those designed to prevent/reduce speeding in the general population.

Chapter 5 presents a literature review undertaken by Brainbox to identify the extent to which these potentially effective means of behaviour change have been used in interventions to change speeding behaviour. Eleven published studies describing separate interventions were identified. These provide evidence to suggest that effective speed awareness courses should be based on information and education, and make use of materials that are credible and forceful. Threat- and shock-based

materials are more effective when combined with information on methods of driving more safely. Interventions should include group discussions that address driving problems and how to solve them, and, where possible, should be tailored to individual drivers. Frequent high-speeders and socially deviant drivers are likely to require additional material on why the course is relevant to them, and more material to change their attitudes towards speeding. Moderate, occasional drivers are more likely to require information on why exceeding the speed limit by a few miles is not safe. Chapter 5 also maps current speed awareness courses in the UK against effective intervention components.

Chapter 6 reports an evaluation of existing speed awareness courses. Ten speed awareness courses that are currently run by Safety Camera Partnerships were identified. Courses could be broadly divided into three types:

- classroom-based presentations and discussions together with a driving demonstration and practice;
- classroom-based presentations and discussions without the practice element; and
- a seminar.

One course also included a computerised driving behaviour questionnaire and hazard perception test, which provides drivers with a personalised risk-profile. The majority of courses targeted drivers detected speeding just above the 30 mph enforcement limit, usually 35–39 mph, and some also invited drivers detected in 40, 50 and 60 mph zones. One course was for drivers detected driving at excessive speeds, e.g. 50 mph in a 30 mph zone. The courses tended to have a common core content, including:

- the reasons people speed;
- the consequences of speeding;
- stopping distances at different speeds;
- the likelihood that pedestrians will die when hit at different speeds;
- the purpose of safety cameras and the criteria used for situating them;
- identifying speed limits;
- hazard perception; and
- selecting an appropriate speed.

Four of the courses contain a two- or three-hour practical session in which two or three drivers practise their driving with an Advanced Driving Instructor. Clients are asked to identify speed limits, hazards and appropriate driving speeds. In addition to assessing venue and instructor quality, we recommend that course evaluations should include a questionnaire to assess:

- clients' intentions to speed;
- their confidence in identifying the speed limit of different roads;
- their confidence in their ability to apply what they have learnt; and
- their attitudes toward speeding, including subjective norms.

A questionnaire on intentions to speed, attitude towards speeding, subjective norms regarding speeding and confidence in identifying the correct speed limit should be sent to clients before the course, and they should be asked to complete the same questionnaire directly after the course. The impact of the course on these areas should be assessed. We further suggest that an evaluation should assess the effectiveness of the course in changing speeding behaviour. This should be undertaken by recording subsequent speeding offences in a group of clients who have attended the course and in a matched group who chose not to attend the course. Speeding offences should be recorded nationally rather than at a local level, with a minimum follow-up period of six months. The proportion of drivers offered the course who choose to attend (i.e. uptake rates) should also be monitored.

Part two of the report summarises the discussions that took place during an expert group meeting of scientists and speed awareness course stakeholders, with the aim of discussing the research and agreeing a set of feasible practical recommendations for police forces and course providers. While the courses are targeted primarily at unintentional and moderate speeders, all four types of speeding drivers are likely to attend, so a core component should be delivered to all drivers, with some tailored components added for the most deviant two groups.

Details of the cost and duration of the course were discussed. It was agreed that the cost of courses (time and money) should not have an adverse affect on uptake. While longer behavioural programmes, particularly those delivered at more than one time point, tend to be more effective, practical constraints on course providers and clients could make it difficult to deliver multi-session courses successfully. The group recommended three course structures of increasing robustness:

- a half-day classroom course;
- a full-day course (half-day classroom and half-day practical); and
- a full-day course followed one week later by a half-day classroom discussion.

The best possible course type should be provided given the available resources and constraints. Course content was also discussed. It was agreed that all constructs identified by the research review should be included in the courses. The Association of Chief Police Officers (ACPO) course model has provided a starting point and the scientists were tasked, post-meeting, with mapping the ACPO course against the effective interventions identified in the review (Section 7.3), and using the research findings to develop suggestions for course content (Section 7.4). The group agreed

that, while some prescription on course content is needed, this should be limited to essential parameters so as to allow the flexibility to tailor the intervention to individual attenders. The method of delivery is important: elaboration, discussion and problem solving are vital, and methods that make attenders engage and interact with the material should be used. There is evidence that post-course reminders are effective, and the group agreed that such reminders, by way of posted leaflets with key messages, should be sent to all attenders some weeks after course completion. This should be a checklist of things drivers have to put in practice. A constant reminder – such as a key ring with key messages – might also be useful.

The group agreed that quality assurance is important and should be monitored closely. A percentage of courses could be observed, and the cost of this validation could be covered within the course fee. In addition to the quality of provision, course effectiveness should also be evaluated. At present, the majority of evaluations are of client acceptance rather than whether the course's aims have been achieved. The opportunities for control group data from regions that do not currently offer a speed awareness course should be explored in the near future. As well as being validated, the way in which courses should be evaluated was discussed. It was agreed that the scientists should work together after the meeting to develop an evaluation methodology. The scientists recommended (Section 7.5) that this should include both intentions and attitudes to speeding, and also changes in each of the constructs that the course aims to address (e.g. self-efficacy, normative beliefs). Measures should be taken at three time points:

- before the course;
- directly afterwards (clients should complete and return their questionnaires at the course rather than at home so as to reduce data loss from non-returned questionnaires); and
- 12 months after the course.

Re-offending data should also be collected over the 12-month post-course period.

PART 1 RESEARCH REPORT

1 MODELS USED TO PREDICT AND MODIFY BEHAVIOUR

There are several health psychology theories that aim to predict behaviour and to model the way in which individuals make decisions about their health. Increasingly, such theories have been used in the design and implementation of interventions to change risky behaviours. The main models relevant to this report are outlined below.

1.1 Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) (Ajzen, 1991) proposes that behaviour is determined by **intention** to engage in that behaviour and **perceptions of control** over that behaviour. Intentions represent a person's motivation in the sense of her or his conscious plan or decision to perform the behaviour, and are determined by three factors. The first of these is **attitudes**, which are the overall evaluations of the behaviour by the individual. The second is **subjective norms**, which consist of a person's beliefs about whether significant others think he or she should engage in the behaviour. The third determinant of intentions is **perceived behavioural control** (PBC), which is the individual's perception of the extent to which the behaviour is easy or difficult to perform. So, according to the TPB, a driver is likely to avoid speeding if he or she believes that this will lead to particular outcomes which the driver values (such as avoiding points or reducing the risk of crashing), if the driver believes that people whose views they value think they should avoid speeding, and if the driver feels that they have the necessary resources and opportunities to do so.

1.2 Health Belief Model

The Health Belief Model (HBM) contains two main components: (a) perceptions of a health threat; and (b) evaluations of the effectiveness of behaviours aimed at counteracting the threat. Threat perceptions result from beliefs about the **perceived susceptibility** to the illness or adverse event and the **perceived severity** of its consequences. Perceived severity is not just concerned with medical consequences, but also with the potential effects of an illness or event on an individual's job, family life and social relations. Whether or not an individual engages in a health-related behaviour is determined by the combined effect of these two variables. An individual will decide upon the particular action to be taken by evaluating the possible alternatives. Health behaviours will be evaluated in terms of their **perceived benefits** or efficacy (such as reducing the risk of crashing) and also by their **perceived costs or barriers** (such as it being inconvenient, unpleasant or expensive).

A further predictor of behaviour in the HBM is **cues to action**, commonly divided into factors which are internal (e.g. physical symptoms) or external (e.g. mass media campaigns, advice from others) to the individual. **Health motivation** was suggested by Becker (1974) as a further component of the model. Becker defined health motivation as readiness to be concerned about health matters and argued for its inclusion in the model as certain individuals may be predisposed to respond to cues to action because of the value they place on their health. Therefore, according to the HBM, a driver is likely to avoid speeding if:

- they believe that they are susceptible to negative outcomes, such as being fined or being involved in a crash and that these outcomes are serious;
- they believe the benefits of not speeding outweigh the costs; and
- that they notice that they are travelling fast and observe safety cameras.

1.3 Protection Motivation Theory

Protection Motivation Theory (PMT) explains fear appeals. As typically applied (Maddux and Rogers, 1983), PMT describes adaptive and maladaptive coping with a threat as the result of two appraisal processes: threat appraisal and coping appraisal. Threat appraisal is based on perceptions of **susceptibility** and **severity** of the threat. Coping appraisal involves the process of assessing the behavioural alternatives which might diminish the threat. This coping process is assumed to be based upon two components: the individual's expectancy that carrying out a behaviour can remove the threat (**action-outcome efficacy**), and a belief in one's capability to successfully execute the recommended courses of action (**self-efficacy**). Together these two appraisal processes result in the **intention** to perform adaptive or maladaptive responses. Adaptive responses are more likely if the individual perceives themselves to be susceptible to a threat which is perceived as being severe; fear arousal is assumed to operate via increasing these perceptions of susceptibility and severity. Adaptive responses are also more likely if the individual perceives them to be effective in reducing the threat and believes that he or she can successfully perform the adaptive response. Protection motivation is typically operationalised as the intention to perform the health-protective behaviour or avoid the health-compromising behaviour in order to protect oneself from danger. The likelihood that an individual would perform adaptive behaviours (drive within the speed limit) increases when they perceive strong self-efficacy (e.g. 'I know what the limit is and I am able to drive within it') and response-efficacy (e.g. 'If I drive within the limit I won't be flashed by a camera'), and few costs associated with performing that behaviour (e.g. 'Driving within the limit won't add much extra time to my journey'). In contrast, the likelihood of performing maladaptive behaviours (speeding) is increased when they hold positive beliefs about the rewards associated with the maladaptive behaviour (e.g. 'Speeding is exciting and it will get me there faster') and low vulnerability (e.g. 'I can drive fast safely'), and severity of the risks involved (e.g. 'Three points won't make much difference to me').

1.4 Social Cognitive Theory

In Social Cognitive Theory (SCT; Bandura, 1982) human motivation and action are assumed to be based upon three types of expectancies: **situation-outcome, action-outcome** and **perceived self-efficacy**, although the focus is on the latter two and self-efficacy in particular. Situation-outcome expectancies represent beliefs about which consequences will occur without personal action. Susceptibility to a health threat represents one such situation-outcome expectancy. Action-outcome expectancy is the belief that a given behaviour will or will not lead to a given outcome. For example, the belief that slowing down will lead to a reduced risk of crashing would represent an action-outcome expectancy. Self-efficacy expectancy is the belief that a behaviour, such as complying with the speed limit, is or is not within an individual's control. SCT also includes **goals** and **perceived impediments and opportunities**.

1.5 Implementation intentions

A construct that appears important to the translation of intentions into actions is implementation intentions (Gollwitzer, 1993). While goal intentions are concerned with intentions to perform a behaviour or achieve a goal (i.e. 'I intend to comply with the speed limit'), implementation intentions are concerned with plans as to when, where and how the goal intention is to be translated into behaviour (i.e. 'I intend to comply with the speed limit when I drive to work'). The important point about implementation intentions is that they commit the individual to a specific course of action when certain environmental conditions are met; in so doing, they help translate goal intentions into action. Gollwitzer (1993) argues that by making implementation intentions, individuals pass control to the environment. The environment therefore acts as a cue to action, such that when certain conditions are met, the performance of the intended behaviour follows almost automatically.

1.6 Transtheoretical Model

The Transtheoretical Model (TTM) is the dominant 'stage' model in health psychology and health promotion. Such stage models are different from the models considered above in that they consider behaviour change to occur through a series of stages. Such models focus on factors that predict stage transition rather than those that predict intention or behaviour. Although often referred to as the stages of change model, the TTM includes several constructs: the **stages of change**, the **pros and cons of changing** (together known as **decisional balance**), **confidence and temptation**, and the **processes of change**. The TTM was an attempt to integrate these different constructs into a single coherent model. The most widely used version of the model specifies five stages:

- **precontemplation**, where the person has no intention of making changes ('I am happy speeding and intend to continue speeding');

- **contemplation,** where the person is considering changing ('Perhaps I should make sure that I don't speed in future');
- **preparation,** where the individual makes some small change to their behaviour ('I will try to stop speeding in pedestrian areas');
- **action,** where the individual is engaged in changing their behaviour ('I have stopped speeding'); and
- **maintenance,** where the individual has been sustaining that behaviour changes over time ('I have not been speeding for months').

People are assumed to move through the stages in order, but they may relapse from action or maintenance to an earlier stage, or they may cycle through the stages several times before achieving long-term behaviour change. Drivers would therefore start by not considering reducing their speed (precontemplation), then think about it (contemplation), then find out more about identifying speed limits and techniques to reduce their speed (preparation), then apply this to drive within the speed limit (action) until such driving behaviour becomes habit (maintenance). The pros and cons are the perceived advantages and disadvantages of changing one's behaviour. Confidence is similar to Bandura's (1997) construct of self-efficacy; it refers to the confidence that one can carry out the recommended behaviour across a range of potentially difficult situations. Temptation refers to the temptation to engage in the unhealthy behaviour across a range of difficult situations. Finally, the processes of change are the covert and overt activities that people engage in to progress through the stages. Prochaska *et al.* (2004) have identified 10 such processes that appear to be common to a number of different behaviours: five experiential (or cognitive-affective) processes and five behavioural processes.

1.7 Self-regulation Model

The Self-regulation Model was developed in the context of chronic illness and processing information from health-threatening messages. It was proposed that individuals form a lay **representation** of their illness or condition and that the representation has both **cognitive** and **emotional** content. According to the theory, if the condition or event is represented as sufficiently threatening by an individual, they will be compelled to search for appropriate **coping procedures** to reduce the perceived threat. Coping procedures may be active (behavioral) or passive (psychological), and are applied to both the cognitive and emotional components of the representation. The effectiveness of these coping procedures is appraised and, if necessary, the person modifies their representation of the illness. Applied to speeding, drivers would form a representation of speeding based on both what they think of speeding (e.g. safety, time saving, risk of being caught) and how it makes them feel (e.g. exhilarated, skilled, nervous, stressed). They apply coping procedures to reduce the threat from both their beliefs and their feelings. For example, the driver who speeds and is not detected and does not crash, might modify their

representation of speeding as being safer and they might choose to continue to drive faster. The driver who is detected might change their representation so that speeding is perceived as being less safe, and may cope by decreasing their speed, either generally or in areas where safety cameras are located.

1.8 Comparing the different models

Despite the substantial volume of empirical work using the above social cognition models (SCMs) to predict a range of behaviours, there has been little empirical work comparing the predictive power of the different models (Conner and Norman, 2005). A number of authors have commented on the theoretical overlap between constructs contained in the main SCMs (e.g. Norman and Conner, 2005). First, models that have been developed specifically to predict health behaviour (i.e. HBM and PMT) focus on the notion of threat as measured by perceived susceptibility and perceived severity. In addition, SCT focuses on expectancies about environmental cues (i.e. risk perception). In contrast, the TPB does not explicitly cater for emotional or arousal variables, leading some authors to suggest that the TPB may be limited to the rational part of a health decision. Second, most SCMs of health behaviour focus on the perceived consequences of performing a health behaviour (e.g. Weinstein, 1993). For example, in the TPB the focus is on behavioural beliefs, in the HBM it is on the benefits and costs of performing a health behaviour, while in SCT it is on outcome expectancies and in PMT it is on response-efficacy. Third, there is considerable overlap between the PBC component of the TPB and self-efficacy (Ajzen, 1991). A number of the models also focus on specific control issues or barriers to the performance of health behaviour. Thus, a similarity can be noted between control beliefs in the TPB, the perceived barriers dimension of the HBM and the response costs in the PMT (Conner and Norman, 1994). Fourth, normative influences on behaviour are not explicitly covered by SCMs of health behaviour (Conner and Norman, 1994), with the exception of the TPB which includes the subjective norm construct and underlying normative beliefs. In the HBM, normative influences are simply listed as one of many potential cues to action. In SCT, normative influences may be covered by outcome expectancies that focus on the perceived social consequences of behaviour. Fifth, the TPB, SCT and PMT include an intervening variable which is seen to mediate the relationship between other social cognitive variables and behaviour (Weinstein, 1993). In the TPB this variable is behavioural intention, while in PMT it is labelled protection motivation. Sixth, the TPB and SCT also postulate a direct relationship between self-efficacy (or PBC) and behaviour, in addition to the one between intention and behaviour.

A number of conclusions can be drawn from the above comparisons (Norman and Conner, 2005). First, there is considerable overlap between the constructs included in the models. For example, most focus on outcome expectancies or the consequences of performing a behaviour. Second, some of the models may usefully be expanded to consider normative influences and perceived threat. Third, there is a strong case for including self-efficacy in all models of health behaviour. Fourth,

behavioural intention should be included in all models as a mediating variable between other social cognitive variables and behaviour. Not only does intention typically emerge as the strongest predictor of behaviour but it also marks the end of a motivational phase of decision making that many SCMs focus upon.

Tables 1.1 and 1.2 summarise data from a review of the predictive power of constructs taken from these different models (Conner and Norman, 2005). Table 1.1 shows their power to predict behaviour, while Table 1.2 shows their power to predict intentions. In both tables, *k* is the number of studies, *n* the total sample size, and *r*+ the effect size. The relationship between intention and behaviour equates to large effect sizes (*r*+ ~0.5) for the TPB and PMT. The relationship between behaviour and PBC and attitude (TPB) and response costs (PMT) are of a medium effect size (*r*+ ~0.3). Other relationships have small (*r*+ ~0.1) to medium (*r*+ ~0.3) effect sizes.

Table 1.1: A meta-analytic integration of the predictors of behaviour from the reviewed SCMs

Relationship	*k*	*n*	r_+
TRA/TPB[1]			
Intention – behaviour	420	82,712	0.48[1]
PBC – behaviour	241	55,444	0.35[2]
Attitude – behaviour	126	28,495	0.36[2]
Subjective norm – behaviour	122	28,410	0.16
HBM[2]			
Barriers – behaviour	16	-	-0.21
Susceptibility – behaviour	16	-	0.15
Benefits – behaviour	16	-	0.13
Severity – behaviour	16	-	0.09
PMT[3]			
Vulnerability – behaviour	4	401	0.12[4]
Severity - behaviour	4	372	0.07
Fear – behaviour	1	194	-0.04
Self-efficacy – behaviour	5	512	0.22
Response efficacy – behaviour	4	388	0.09
Response costs – behaviour	2	194	0.25
Intention – behaviour	4	432	0.40
SCT[4]			
Self-efficacy – behaviour	20	6,913	0.23
Outcome expectancy – behaviour	17	5,502	0.17
Goal Intention – behaviour	4	1,453	0.30
Sociostructural factors – behaviour	1	299	0.20

1 From Conner and Sparks (2005).
2 From Harrison *et al.* (1992).
3 From Milne *et al.* (2000).
4 From Conner *et al.* (2005).

Table 1.2: A meta-analytic integration of the predictors of intentions from the reviewed SCMs

Relationship	*k*	*n*	r_+
TRA/TPB[1]			
Attitude – intention	497	111,558	0.51
Subjective norm – intention	472	109,111	0.34
PBC – intention	386	95,877	0.43
HBM[2]			
–			
PMT[3]			
Vulnerability – intention	10	1,366	0.16
Severity – intention	9	1,196	0.10
Fear – intention	4	411	0.20
Self-efficacy – intention	13	2,161	0.33
Response efficacy – intention	12	1,756	0.29
Response costs – intention	4	631	0.34
SCT[4]			
Self-efficacy – goal intention	3	1,154	0.52
Outcome expectancy – goal intention	5	2,999	0.28
Sociostructural factors – goal intention	1	299	0.16

1 From Conner and Sparks (2005).
2 From Harrison *et al.* (1992).
3 From Milne *et al.* (2000).
4 From Conner *et al.* (2005).

1.9 Conclusion

The review indicates that the strongest predictors of behaviour are, in descending order of importance: intention, attitude, PBC, and self-efficacy. Effective interventions should, theoretically, target these areas. However, the models do not indicate which of these constructs are more amenable to change, so that even though intention to drive within the speed limit would be the greatest predictor of not speeding, it may be difficult to change intention directly, and the other predictors, although having less predictive power, may be easier to change. The evidence for the effectiveness of interventions in changing behaviour is addressed in Chapter 4.

2 SOCIAL COGNITION PREDICTORS OF SPEEDING

Between January and March 2005 a review of the speeding literature, using PsycInfo, Medline and Web of Knowledge databases, was conducted by the University of Leeds. The aim of the review was to investigate the relationship between psychological theoretical models, component constructs, and speeding intentions and behaviour. Methodological details are provided in the full report (Conner *et al.*, 2005). A total of 613 papers were generated by this search. Application of the inclusion criteria – (1) empirical studies, (2) included speed intentions or behaviour as an outcome variable and (3) measurement of psychological construct/s – reduced this to 24 articles and book chapters. The review is structured around the psychological constructs used in these studies.

2.1 Influence of others

Four studies explicitly investigated the influence of others on speeding behaviour. These social influences were conceptualised as:

1. the perception of other drivers' speed (Aberg *et al.*, 1997; Groeger and Chapman, 1997);
2. the direct influence of a passenger via social facilitation (Baxter *et al.*, 1990); and
3. perceived normative pressure from a passenger (Conner *et al.*, 2003).

In 1993, Connolly and Aberg suggested a contagion model of drivers based on the view that speed is affected by a comparison of one's own speed with that of other nearby drivers; this model was later tested by Aberg *et al.* (1997). The findings indicated that drivers who engaged in speeding were more likely to overestimate the speeding of others and were more likely to want to drive like others, and these effects were not mediated by attitudes toward speeding.

Groeger and Chapman (1997) tested the contagion model by studying the extent to which speed varied as a function of others' speeding behaviour and information about the normative compliance level via the posting of roadside variable message signs. These experiments demonstrated that posted information about the percentage of people complying with the speed limit can be effective in reducing traffic speeds, but only when other traffic appears to be complying with this posted information. Thus, the presentation of normative information in the form of variable message signs is ineffective when the behaviour of those around contradicts this message.

Baxter *et al.* (1990) used an in-car observational technique to investigate the social facilitation effects of passengers of different ages and genders for different groups of

drivers. Younger drivers drove faster than older drivers. Slower speeds were adopted by drivers with older female passengers than when drivers were alone or with either male or female younger passengers. Young male passengers were associated with the highest levels of speeding.

A scenario-based questionnaire study to assess the impact of the gender of passengers on intentions to break the speed limit was carried out by Conner *et al.* (2003). Male drivers did not differ from females in their intentions to speed in this study. Young men appear to perceive greater social pressure to speed than young women. Normative pressure was also more likely to predict intentions to speed for men than women, particularly when driving alone. The results also suggest that intentions are predicted more strongly by normative pressure in driving situations in which the passenger is a young male. Together, these findings suggest that normative pressure arising from young male drivers is strongest and that this might have the most significant effect on the speed adopted by young male drivers.

These studies of social influence on drivers' speeding intentions and behaviour have important implications for interventions to reduce speeding. Changing the perceived normative pressure from young men, and targeting these same male drivers, perhaps by undermining the norms that promote speeding, might be a useful target for intervention. One way this might be achieved is through the ridiculing of attempts to impress a male passenger with fast driving. However, the findings from the contagion model suggest that the effects of this kind of intervention might be short lived if the target audience perceives that the norm on the roads is to drive above the speed limit. Intervention on two fronts, via enforcement of the speed limit and thus the reduction of the observed average speed (actual social influence), together with interventions to undermine the norms that sustain fast driving amongst those most at risk (young men), may be required to produce any longer-lasting effect.

2.2 Perceived risk

Two studies identified in this review examined speeding in relation to perceptions of risk. Adams-Guppy and Guppy (1995) investigated the role of the perceived probability of adverse events (perceived risk) together with utility measures (e.g. the importance of getting to a destination on time) in predicting self-reported behaviour. Drivers were asked to report on their frequency of speeding on motorways at 10 mph and 20 mph above the speed limit. Hierarchical multiple regressions indicated that, while perceptions of the risk of injury were not good predictors, time pressure was a good indicator. This finding implies that more frequently occurring positive factors are better predictors of behaviour than rare, but negative, events.

Brown and Cotton (2003) interviewed drivers about their perceptions of risk in relation to speeding, and risk-mitigating beliefs (the common-sense notions that a driver might employ to justify their speeding, e.g. that it is ok to speed when there are no cars around or when driving on a straight road). The findings suggest that

those who adopt risk-mitigating beliefs report higher levels of speeding. Moreover, as estimates of risk partially mediated this effect, the implication is that these risk-mitigating beliefs may serve to reduce perceptions of the risk of speeding. The authors also identified that those drivers who reported speeding perceived higher levels of negative consequences.

Lawton *et al.* (1997) used a scenario-based questionnaire to investigate attitudes towards speeding in five different contexts:

- a residential street (30 mph limit);
- a busy shopping street (30 mph limit);
- a winding country road (50 mph limit);
- a dual-carriageway (60 mph limit); and
- a motorway (70 mph limit).

Half of the drivers considered speeding 10 mph above the speed limit, while the other half considered a 33% margin (i.e. 93 mph on a motorway). Drivers were asked to indicate their intentions to exceed the speed limit, as described in the scenario. They were also asked to indicate how serious an offence, and how risky and annoying to other road users, the speeding depicted in the scenario was. Drivers reported being most likely to speed in a residential street and this was associated with lower negative consequences. Moreover, perceptions of negative consequences were a significant and important predictor of intentions across scenarios.

The results of the studies reported here suggest that the relationships are complex. Although, intuitively, one might expect that those people who perceive the risks associated with speeding to be high will be less likely to speed, other factors seem to be more important, such as benefits (e.g. getting to the destination more quickly). As drivers rarely experience negative outcomes such as accidents, fines, etc., they may employ risk-mitigating beliefs as a defensive strategy that allows them to maintain speeding. Campaigns designed to increase perceptions of risk may be less effective than campaigns that undermine the experience of the positives associated with the behaviour. Support for this comes from a study by De Waard and Rooijers (1994) which showed low-speed drivers to have neutral attitudes toward speeding, while fined and unfined offenders had equally positive attitudes. Thus, the experience of a negative consequence seems to have done little to change attitudes. This has implications for interventions designed to reduce speeding. It suggests that emphasising the negative consequences associated with speeding may not be effective in reducing intentions to speed.

2.3 Theory of Planned Behaviour

Three studies designed to test the TPB in the context of intention to speed are described below. Three additional studies were identified which used the TPB as a framework for an intervention, and these are described in Section 5.1.

Newnam *et al.* (2004) used the TPB to predict speeding intentions when driving both work and personal vehicles. Participants were presented with a scenario describing a driver travelling at 65 kph in a 50 kph zone. Two regressions were performed predicting the intention to speed in a personal vehicle and the intention to speed in a work vehicle. The total variance accounted for was 27% and 16% respectively. In both cases the strongest predictor of speeding intention was anticipated regret. Attitude and PBC were also significant predictors of intention to speed in a personal vehicle.

Parker *et al.* (1992a,b) investigated intentions to drive at 40 mph in a 30 mph zone. Eight-hundred drivers were recruited to the study, stratified by age and sex. The items included in the questionnaire were elicited via a previous pilot study involving 240 drivers. Together the TPB variables accounted for 47.2% of the variance and all were significant predictors. The strongest predictor was PBC (β = -0.39) and subjective norm ($\beta = 0.30$). Thus, those people who reported intentions to speed at 40 mph in a 30 mph zone were more likely to have lower perceptions of control over their speeding and to feel that important others agreed with their speeding.

The two studies above, not only rely on self-report, but they are cross-sectional and attempt to predict speeding intentions, rather than speeding behaviour. Elliot *et al.* (2003) addressed some of these limitations in their prospective study of compliance with speed limits in built-up areas. Demographic information, TPB variables and past behaviour were measured, and three months later their speeding behaviour was recorded. The TPB variables all significantly predicted intention, with the strongest predictor being PBC. Both intention and PBC were significant predictors of behaviour. The authors conclude that targeting PBC as the strongest predictor of intention and a significant direct predictor of reported behaviour might be a useful means of reducing speeding.

Studies of speeding using the TPB as a framework have consistently identified that feelings of control are important in predicting both intentions and self-reported behaviour. This finding is also revealed in prospective studies, making the argument for causation stronger. Hence, regardless of whether drivers use perceived lack of control as an excuse for their speeding or whether their actual or perceived level of control causes them to drive fast, this is an important variable to target. Another promising target for intervention, that has been little researched, are the emotions around speeding. Both anticipated regret (operationalised as how good speeding makes you feel) and affective beliefs have been shown to be influential in changing attitudes and predicting intentions and self-reported behaviour.

2.4 Personality characteristics

Six studies investigated the relationship between personality characteristics of the driver and reported or actual speeding behaviour. In a study of the demographic and personality predictors of risky driving, Boyce and Geller (2002) also investigated the extent to which risky behaviours covary. Measures of personality included thrill-seeking, impulsivity, hostility, trait anger, perceptions of invulnerability, locus of control and Type A personality. Regression analyses identified that mean speed across the trial was predicted by age (r = -0.59) and Type A personality (r = 0.33); together these variables accounted for 42% of the variance. Significant correlations were found between speeding, driving too closely and off-task behaviours, which offers support for problem behaviour syndrome. This, they suggest, is important because intervening to change one's behaviour will impact on other driving behaviours.

West *et al.* (1993) did not find a significant relationship between Type A behaviour and reported speeding amongst a sample of drivers in the UK. However, reported speed was significantly predicted by social deviance (β 0.36), thoroughness (β = −0.14) and annual mileage (β = 0.28).

Jonah *et al.* (2001) found that high sensation seekers were more likely to report driving at 120 kph or faster if there was no speed limit. This same group also rated driving at this speed as more exciting. Whissell and Bigelow (2003) also investigated sensation seeking in driving, via a newly developed speeding attitude scale, and tested the extent to which responses on this measure were associated with having been issued with speeding tickets. The authors report a significant correlation (r = 0.16) between sensation seeking and speeding tickets. The scale itself measures the extent to which driving fast is experienced as thrilling and fun, and whether mood effects one's driving. Sumer (2003) used structural equation modelling techniques to develop a contextualised model of risky driving. Sensation seeking was found to be a large and significant predictor of speeding, with a path coefficient of 0.60. Hammond and Horswill (2001) suggest that the desire for control might be crucial in distinguishing speeders from non-speeders. Significant differences in speed choice were found for those people with a high desire for control (9.44 mph) and those with a low desire for control (3.20 mph).

Together, these findings suggest that while personality might be a factor in speed choice, there is no clear evidence as to which personality dimension is most important. Moreover, identifying personality characteristics that might be correlated with reported or actual speeding behaviour is not particularly helpful in developing interventions, except perhaps in appealing to the personality of certain drivers in targeted speeding campaigns or where personality moderates the influence of other, more easily modified predictors of speeding behaviour.

2.5 Affect

Four studies have investigated the effect on speeding of various forms of threat message designed to promote fear. Ben-Ari *et al.* (1999; 2000) investigate the effect of increasing mortality salience on reported speeding behaviour and simulated speeding behaviour. Making mortality more salient will have the effect of reducing sensitivity to fatal costs and will increase awareness of the self-relevant esteem-related gains. Thus, the authors predicted that, for drivers who perceived driving as relevant to their self-esteem, speeding would increase as a result of mortality salience. When mortality was made salient, participants for whom driving was important to their self-esteem increased their speed, whereas those for whom driving was not important to self-esteem, decreased their speed. These effects were found for both self-report behaviour and driving in a simulator. Positive feedback about driving skills was found to weaken the effects of mortality salience on driving speed.

In two further studies, Ben-Ari *et al.* (2000) argued that threat appeals in the form of road safety adverts could be conceptualised as mortality salience inductions. Therefore, they hypothesise that road safety adverts will have a differential effect on those for whom driving is highly relevant to their self-esteem and for those for whom it is not. The first experiment, based on self-reported reckless driving, contradicted the previous findings: the threat appeal appeared to significantly reduce reported reckless driving when driving was relevant to self-esteem compared to when it was not. In a follow-up study, in which speed in a simulator was the dependent variable, the previous findings were supported. The videos served to reduce speeding for drivers when driving was not relevant to self-esteem, but had the effect of increasing speeding amongst those for whom driving was relevant. Together, these findings suggest that, for some groups of drivers, fear-inducing adverts that make mortality more salient may have an undesired effect. However, the long-term impact of mortality salience is unknown, and further research is required to understand why the findings were different for self-report and simulator driving behaviour.

Rossiter and Thornton (2004) also conducted a study to investigate the patterns of fear and relief generated during television anti-speeding adverts, and the impact of these adverts on speed choice in a video speed test. The participants were randomly assigned to watch either a shock-based anti-speeding advert or a fear-relief advert. Participants were exposed to the videos for five minutes, for three consecutive weeks. At the end of the video in week three, participants completed a video speed test which measured the tendency to speed up or slow down compared with the driver in six driving scenarios. A comparison, control group was also recruited which completed the video speed test without seeing the commercial. While speed was lower for the fear-relief advert compared with the control after both moderate and heavy exposure to the video, the shock advert appeared to result in greater speeds amongst males than for the control group

Walton and McKeown (2001) investigated the reactions to safety campaigns of drivers with biased perceptions about their own speeding behaviour in comparison to that of others. Participants reported their usual speed (on 50 kph and 100 kph roads) and their perception of the speed of others on these same roads. Participants who reported that their speed was higher than the actual average speed, but lower than other drivers, were allocated to the biased perception group. In the second part of the survey, participants were asked to indicate whether anti-speeding messages were intended for 'people like me' or 'intended for others'. For all but one of the five slogans tested, those drivers in the biased perception group were significantly more likely to report that the slogans were directed at others, rather than themselves. The authors concluded that safety messages might be ignored by speeding drivers because they have biased perceptions about their driving in comparison to others and so they feel that the messages are targeted at others. Another group of drivers clearly recognised that they engaged in speeding and that the messages were aimed at them but, given their reports of speeding, had obviously been unaffected by the messages. These findings suggest that safety campaigns may do little to change the behaviour of those drivers most at risk.

Together these studies suggest that caution is needed when developing road safety campaigns that involve generating extremes of negative affect – shock, fear or mortality salience. While these approaches may be effective for some drivers, it is possible that for those for whom driving is important to self-esteem, or for drivers with biased perceptions about their speed in comparison to others, these campaigns may have undesirable or limited effects.

2.6 Conclusions

There is now a body of research investigating the social cognition constructs predicting speeding intentions and behaviour. However, the heterogeneity of this research with respect to sample type (student, employees, drivers in the general population), road type (e.g. motorway or suburban road), speeding measure (i.e. absolute speed/speed choice or likelihood of travelling at 40 mph in 30 mph zone) and whether measures are of intentions/behaviour, are self-report or objective, and the variety of psychological factors investigated (e.g. personality, risk perception, control, attitudes, social influence), means that it is difficult to draw any strong conclusions. Moreover, it is possible to make only tentative claims about causative relationships as 13 of the 24 papers reviewed here report research that is cross sectional. There is also evidence from this review that the benefits associated with speeding, for example reaching a destination more quickly, may be as, if not more, important than the risks associated with speeding in predicting self-reported intentions and behaviour. The findings also indicate an important role for perceptions of control in predicting this risk-taking behaviour. Indeed, all of the studies that measured PBC as a component of the TPB identified that this variable was a significant and large predictor of intentions and behaviour.

The papers reviewed here also point to the need to distinguish between the majority of drivers for whom speeding is moderate and is 'normal' (i.e. it is not considered deviant), and those drivers who adopt speeds that are considerably higher than the norm. This second group of drivers appears to be comprised of those who are the least deterred by speed cameras and for whom the negative consequences associated with the behaviour may be the least important. They may also be amongst a group of drivers who engage in other risky driving practices (e.g. dangerous overtaking). The evidence above suggests that these drivers may ignore anti-speeding messages either because they do not think they are targeted at them or because they adopt strategies (e.g. risk-mitigating beliefs) that reinforce their speeding.

Together, these findings suggest that, while road safety campaigns containing risk information and speed enforcement strategies may be useful in deterring drivers, en masse, from speeding and in maintaining current average speeds on roads in the UK, these same strategies may be ineffective in tackling the worst offenders. Indeed, for this group of drivers, the benefits associated with driving fast, perhaps the thrill, excitement and social kudos that speeding generates, may be sufficient to maintain the behaviour despite the threat of negative consequences. Different forms of interventions may be necessary for this group.

3 ARE THERE DIFFERENT SUB-GROUPS OF SPEEDING DRIVER?

In addition to identifying the social cognition predictors of speeding, it is also important to explore wider factors that, from a psychological perspective, could make different types of intervention more effective for different types of speeding driver. A review was therefore undertaken of the national and international literature on speeding drivers in order to identify the psychological correlates of speeding. Specifically, the review questions were:

1. Why do drivers speed?
2. Are there distinct sub-groups of speeding driver for whom different types of intervention are required?

The principles of systematic review were adopted: rigorous and reproducible methods applied to synthesise the available evidence. Full details of the review are found in Fylan and Hempel (2005). The literature search revealed over 3,500 articles. Inclusion screening, based on the title and abstract, or the full article, reduced this to 195. Hand searching, bibliography searches and contact with experts yielded a further 11 studies. Data from the final 206 articles were extracted, and are shown in the data table in Fylan and Hempel (2005). The majority of the studies identified measured self-reported speeds. While this has received some criticism, there is evidence of a reasonable correlation between self-reported and actual speed (Corbett, 2001; Haglund and Aberg, 2000; Walston and Bathurst, 1998). Therefore studies that measure actual and self-reported speed are combined.

3.1 Reasons for speeding

Five psychological reasons for speeding were identified:

1. attitudes and appraisals;
2. perceived normal behaviour and values;
3. personality;
4. self-identity; and
5. intention.

They are explored in the following sections, and are used to differentiate between the sub-groups of different speeding driver.

3.1.1 *Attitudes and appraisals*

Attitudes and appraisals are good predictors of speeding behaviour (Deery and Fildes, 1999; Parker *et al.*, 1992b) and can distinguish between drivers who intend to speed generally from those who speed only occasionally (Lawton *et al.*, 1997). Many drivers evaluate speeding positively and see the outcomes of speeding as beneficial (Caird and Kline, 2004). Particularly in women and older drivers, speeding is related to perceived gains (Yagil, 1998). While some drivers enjoy speeding (Rothengatter, 1998), most (90%) drivers apprehended for speeding report experiencing little or no enjoyment of their speed (McKenna, 2004). The enjoyment or thrill derived from speeding is therefore relevant to only a small number of speeding drivers. Instead, drivers' perceptions of the negative consequences of driving may be a more important factor. Drivers who perceive fewer negative consequences are more likely to speed (Lawton *et al.*, 1997); men in particular perceive fewer disadvantages of speeding (Parker *et al.*, 1992b).

The ways in which attitudes and appraisals influence drivers' speeding behaviour are described in four categories:

- the threat of crashing;
- the threat of being caught speeding;
- the threat of being late; and
- threats to complying.

Threat of crashing

Drivers choose to speed because they are insufficiently aware of the consequences of crashing (Rossiter and Thornton, 2004) and because they do not feel at risk (Dorn and Brown, 2003; Stradling and Cambell, 2003). While the majority of drivers acknowledge that speed causes accidents, drivers who speed frequently perceive speed to be less of an accident risk (Adams-Guppy and Guppy, 1995). This might arise because of the 'car-coon' effect of modern cars, reducing the perception of speed and its associated risk (Silcock *et al.*, 2003) or because drivers consider themselves to be safe or skilled (Karlaftis *et al.*, 2003) and that their driving ability is better than average (Horswill and McKenna, 1999). Indeed, most drivers tend overestimate their own skills (Rothengatter, 2002) and to underestimate driving hazards (Thompson *et al.*, 1985). Hence, speeding occurs because drivers feel in control at high speeds (Corbett and Simon, 1992) and so underestimate the increased risk. It has been suggested that drivers adapt to the risk involved in driving and do not consider it rationally (Summala, 1998). There is a clear link between risk perception and attitude towards complying with the speed limit (Garvill *et al.*, 2003), and between compliance with speed limits and the belief that speed limits reduce accidents (Kenellaidis *et al.*, 1995).

Demographic differences in appraising the threat of crashing are in accordance with police statistics. It has been suggested that young drivers are unrealistically optimistic, which leads them to underestimate their chances of crashing (Rothengatter, 2002). However, some younger drivers realise that their speeding behaviour is risky and they enjoy the risk (Moller, 2004). Men, in particular, overestimate their skill and perceive less risk (DeJoy, 1992). For example, men are more likely to consider that driving at 120 kph in a 70 kph zone is safe (Harre *et al.*, 2000). In summary, most speeding drivers do not believe they are at risk or that they pose a risk to others (Rothengatter, 1988).

Threat of being caught speeding

Drivers who speed believe there is a lower chance of being caught than those who do not speed (Guppy, 1993), and the less chance drivers think there is of being caught, the faster they drive (Parker, 2002; Rothengatter, 1988; Stradling and Campbell, 2003). For this reason, an overt police presence can be effective in reducing the number of drivers who speed (Holland and Conner, 1996; Kanellaidis *et al.*, 1995). However, police enforcement produces only temporary changes in driver behaviour – although small halo-effects exist, reductions in speed are mainly limited to times of deployment (Casey and Lund, 1993), and when drivers have passed the enforced area they speed up again (Shinar and Stiebel, 1986). Drivers adopt this maladaptive coping response in order to maintain their preferred driving speed while minimising the threat of being caught. Drivers who believe that their personal contacts mean any speed penalty will be cancelled are more likely to speed (Lagarde *et al.*, 2004). Hence threat appraisal is important in drivers' speed selection.

There are demographic differences in threat appraisal: older drivers perceive traffic violations as more of a threat than younger drivers (Yagil, 1998), and women think penalties are more lenient than men (Stradling and Campbell, 2003). Personality differences are also important: drivers with high sensitivity to punishment are less likely to speed, whereas those with high sensitivity to reward believe speeding to be enjoyable and are more likely to do so (Castella and Perez, 2004).

Threat of being late

While being in a hurry is reported by several authors as a reason for speeding (e.g. Kanellaidis *et al.*, 1995), it has been estimated that few drivers would speed to arrive on time (Adams-Guppy and Guppy, 1995) and the majority of speeding drivers reported that they were not in a hurry when they were apprehended (McKenna, 2004). Differences in the frequency of being late and drivers' responses to being late may be related to personality. Time urgency is a component of a behaviour pattern known as Type A personality. Furthermore, time pressure seems to increase the influence of the personality traits of aggression and sensation seeking, both of which are linked to speeding (Yagil, 2001).

Threats to complying

Several reasons why drivers decide that it is too difficult to comply with the speed limit have been identified, including believing that it is difficult to drive modern cars below 35 mph (Stradling and Campbell, 2003), and being closely followed (tailgated) by the driver behind (Silcock *et al.*, 2003).

3.1.2 *Influences of perceived normal behaviour and values*

There is substantial evidence that perceived norms influence speed choice, as this can influence drivers' perceptions of speeding as acceptable, common and expected.

Speeding is widely regarded as acceptable (Rosenbloom, 2003) and drivers justify their own speeding because they class it as 'skilled and moderate' speeding rather than 'dangerous' speeding, which they do not identify with (Silcock *et al.*, 2003). Once again, gender differences in this factor are in accordance with police statistics: men (Conner *et al.*, 2003), particularly younger men and those of high socio-economic status (Elliot *et al.*, 2003), perceive there to be less pressures to comply with the speed limit and more facilitators to speeding.

Drivers believe that most other drivers speed (e.g. Stradling and Campbell, 2003) and they are accurate in this belief as speeding is very common (e.g. Aberg *et al.*, 1997). Drivers select their speed based on perceptions of road culture (Silcock *et al.*, 2003) and the speed of nearby cars (Connelly and Aberg, 1993), and speeding intentions are predicted by how fast they think other drivers are travelling. Younger drivers, in particular, are more likely to believe that speeding is common (Yagil, 1998). However, drivers often overestimate average speeds (Aberg *et al.*, 1997) and so believe that they drive slower than average and, therefore, perceive that they are safer than average (Walton and Bathhurst, 1998). Road signs that provide drivers with feedback on the proportion of drivers complying with the speed limit can therefore be effective in reducing speeding – but only when the signs indicate that the majority of other drivers comply (e.g. Groeger and Chapman, 1997). Such signs are particularly good at reducing the speed of faster drivers (Van Houten *et al.*, 1980) but there remains a minority who continue to speed excessively.

The importance of drivers' perceptions of what is expected of them is highlighted by the effect of perceived peer-group approval of speeding and the presence of passengers on speed selection. Younger drivers perceive that others approve more of speeding and they are less likely to refrain from speeding (Parker *et al.*, 1992b). Speeding is more common in young drivers when they are travelling with friends than with parents (Arnett *et al.*, 1997). The highest risk group for speeding is young men – and they are more likely to speed if they are travelling with other young men (Stradling and Campbell, 2003) – and drivers are least likely to speed with an older female passenger (Baxter *et al.*, 1990). A final factor is that of employer expectations: there is an association between speeding in professional drivers and

their perceptions of organisational culture, such as scheduling realistic drive times, and planning routes optimally (Caird and Kline, 2004).

3.1.3 *Personality*

While the effects of personality are likely to be manifest through differences in attitudes and threat appraisal, there is a substantial body of work on the link between several different personality traits and speeding behaviour. Personality traits are described here in four sections:

- sensation seeking;
- Type A personality;
- aggression and emotion; and
- control.

Sensation seeking

The area that has received most attention is that of thrill and sensation seeking. Speeding is related to thrill or adventure seeking. While not all studies have found a significant link between sensation seeking and speeding, the majority have done so (e.g. McKenna, 2004; Meadows *et al.*, 1998; Ulleberg and Rundmo, 2003). Impulsive personalities and those with less empathy are also more likely to speed (Owsley *et al.*, 2003). Recklessness and speeding are also related: they load onto the same factor and are positively related to risk taking (Golias and Karlaftis, 2001). Normlessness has also been linked, with driver anger, to speeding (Iverson and Rundmo, 2002).

Type A personality

People characterised by the Type A behaviour pattern (aggressive, hostile, competitive, impatient and with a high level of time urgency) are more likely to speed (e.g. Perry and Baldwin, 2000). Time pressure is one of the identified reasons for speeding and the experience of time pressure is related to someone's personality: some people experience time pressure more often than others. The Type A behaviour pattern is also characterised by high levels of aggression.

Aggression and emotion

There is substantial evidence that drivers who score high on personality measures of aggression are more likely to speed (e.g. Deffenbacher *et al.*, 2003; McKenna, 2004; Whissell and Bigelow, 2003). Aggressive driving is also correlated with driving violations and with high self-esteem (Stucke, 2001). Drivers whose self-esteem is linked to driving choose higher speeds (Ben-Ari *et al.*, 1999). Personality traits of anger (Deffenbacher *et al.*, 2003), hostility, hyper-competitiveness and emotion are

also linked to speeding behaviour (Houston *et al.*, 2003). Drivers who use their car to express anger also tend to score highly on aggression and to undertake risky driving behaviours (Deffenbacher *et al.*, 2001), and drivers who report experiencing more positive affect and less negative affect are more likely to speed (Lawton *et al.*, 1997), and drivers with higher affect are more likely to worry about the risks of speeding (Rundmo and Iversen, 2004). There is evidence of a link between personality and perceived susceptibility: anxious drivers perceive more risks (Ulleberg and Rundmo, 2003). Two different types of personality clusters relating to speeding have been identified: deviant and aggressive/anxious (Ulleberg, 2001).

Control

Speeding appears to be linked to the desire to be in control: drivers with a high desire for control report the intention to drive faster (Hammond and Horswill, 2001). Drivers with an internal locus of control, who believe that they personally – rather than other road users or chance – control their behaviour, tend to drive faster. Internal locus of control is also associated with other personality measures which affect speeding, such as hostility (Gidron *et al.*, 2003). Speeding drivers believe that the speed limit is too low (Silcock *et al.*, 2003) and report feeling less constrained by the road environment (Kanellaidis, 1995), again suggesting a need to control their own traffic decisions. Speed limits may be viewed as a threat to independent driving behaviour (Peltoniemi, 1982).

3.1.4 Self-identity

Drivers may select speed based on self-identity (Silcock *et al.*, 2003) and, accordingly, speeding behaviour tends to be consistent (Michiels and Schneider, 1984). Many drivers, particularly women and older drivers, believe that traffic laws are important (Yagil, 1998) and they perceive themselves to be law-abiding people (Laapotti *et al.*, 2003) and, as a consequence, they become habitual speed compliers. Gender differences are consistent with this: more women than men observe speed limits 'all the time' (Shinar *et al.*, 2001). Speeding is seen as a male attribute, and men who believe themselves to be more 'macho' are also likely to speed (Krahe and Fenske, 2002) and young male drivers, in particular, view speeding as 'cool'. Driving fast is also thought to raise peer-group status (Moller, 2004) and is therefore a means of expressing oneself and bonding with peers. In contrast, the perception of oneself as a 'good driver', despite speeding, has been reported by several authors. Many drivers believe that because they are a good driver they can speed safely (Dorn and Brown, 2003) and the speed limit, therefore, does not apply to them (Silcock *et al.*, 2003). Drivers reassure themselves that because others drive faster than them they are not a 'real speeder' (Silcock *et al.*, 2003) and that speed campaigns are not aimed at them, but at other 'dangerously fast' drivers (Walton and McKeown, 2001).

3.1.5 *Intention*

Most theories of health-related behaviour distinguish between intention and actual behaviour. Although it has been suggested that unintentional speeding is relatively rare (Silcock *et al.*, 2003), there are several reasons for speeding that fall into this category, including not knowing the speed limit (Stradling and Campbell, 2003) and not realising that you are speeding. A lapse of attention (Corbett and Simon, 1992) can also give rise to unintentional speeding, as can drivers underestimating their speed when they have driven from a higher-speed into a lower-speed zone (Holland and Conner, 1996).

3.2 The psychological sub-types of speeding driver

In order to identify sub-types of speeding drivers, each research finding was listed and different reasons for speeding were combined into groups of congruent reasons. The groups were subsumed iteratively until no further reduction appeared possible: each group contained drivers whose reason for speeding were qualitatively different from those of the other groups. This approach identified four different types of speeding drivers. For the individual types, different speeding interventions appear to be indicated.

- **Unintentional speeders** – drivers who, because of poor knowledge of traffic rules, are not aware of the correct speed limit, or who speed because of a lapse of attention, or who underestimate their speed temporarily, for example when travelling from a high-speed to a low-speed zone. The best way to change the speeding behaviour of this group may be to raise their awareness that they are at risk of speeding, and to teach them tips to identify the speed limit more effectively and to monitor their speed.

- **Moderate occasional speeders** – drivers who consider themselves to be safe and skilled, and who exceed the limit by a level they believe to be relatively low. They do not identify themselves as a speeding driver and they speed less frequently than high speeders. They do not tend to experience pleasure from speeding and they do not generally violate other traffic rules. The best way to change the behaviour of this group may be to increase their awareness of the link between speed and crashing, the more severe consequences of crashing at higher speeds, that they overestimate their own driving skills and the speed at which other drivers travel, and that their speeding behaviour is governed by their own decisions rather than the behaviour of other drivers.

- **Frequent high speeders** – drivers who are aware that they drive faster than average and, while they may acknowledge that this represents an increased risk, they nevertheless believe that they are safe. They have a higher intention to speed and a more positive attitude to speeding than low speeders, and they tend to speed more frequently and experience more pleasure and emotional outlet from driving. These drivers take more risks and report more general accidents or violations. They are usually more experienced drivers and are more likely to be

men. Their high-speed driving may be restricted to certain circumstances, such as a motorway. The best way of changing the speeding behaviour of this group may be to increase their awareness of the link between speed and crashing, the more severe consequences of crashing at higher speeds, the higher penalties and more severe consequences of driving with excessive speed, and that they overestimate their own driving skills. For this group it is very important that their prior beliefs are challenged with appropriate methods, for example demonstrating that speeding leads to a lack of control when needing to avoid an obstacle or to slow down suddenly. For these drivers it is also necessary to put more emphasis on learning new driver behaviour than the previous mentioned groups. These drivers speed out of habit, and habits are notoriously difficult to change. The literature usually shows that it is very difficult simply to stop a habit and that it is necessary to learn and train a new behaviour.

- **Socially deviant drivers** – these drivers acknowledge that their behaviour is dangerous, and they enjoy taking risks and breaking rules. They are more likely to engage in dangerous driving and more general law breaking, and they score higher on the personality measures of psychoticism, thrill, adventure seeking and boredom, and lower on neuroticism. These drivers are more likely to be young, and to engage in more risky behaviour and violations in general. It is likely that parts of this group will lose their driving licence or have serious accidents due to other behaviours than speeding. Younger drivers who lose ('grow out of') this behaviour pattern are most likely to do so by the age of 26. The best way of changing behaviour in this group may be to raise their awareness that their driving behaviour is immature, and that their personality profile causes them to underestimate the risks of speeding.

3.3 A common perspective: matching enforcement and psychological definitions

Identifying the type of speeding driver from a psychological perspective is likely to be problematic when only the observed speed is noted. More information on the individual speeding driver is generally needed. While both unintentional and moderate occasional speeders are likely to exceed the speed limit by only a small amount, frequent high-speed drivers and socially deviant drivers will show a much wider range of speeds. Hence the speed at which a driver is apprehended is not necessarily indicative of their preferred speed. The results of studies that compare drivers attending high- and low-speeding courses confirm this problem. Differences between high- and low-speed drivers are present, but are small. When drivers with the lowest and highest preferred speeds are compared, however, the differences are much more marked: highest-speed drivers report more lapses of attention, are more inclined to use a car as an emotional outlet, derive more independence from driving, and are more aggressive. This indicates that some of the drivers attending low-speed courses are highly likely to fall within the frequent high-speed group.

Drivers travelling at excessive speeds are either frequent high speeders or socially deviant drivers, while drivers travelling at excess speeds could fall into any one of the four groups. The best way of distinguishing between groups would be to examine their driving record. Several previous speeding convictions would indicate that the driver is unlikely to be an unintentional speeder. Any excessive speed convictions would indicate that they are unlikely to be a moderate speeder. Previous traffic violations, but not non-traffic violations, would indicate that they are likely to be a frequent high speeder. Finally, a driver apprehended at an excessive speed with a range of traffic and non-traffic violations is more likely to be a socially deviant driver.

4 EFFECTIVE INTERVENTIONS TO CHANGE BEHAVIOUR

Two independent reviews were conducted to identify the components of interventions that successfully change behaviour. These reviews reached markedly similar conclusions. The only significant differences were that one report (Conner *et al.*, 2005) placed more emphasis on the need to address how speeding makes the driver feel (affect) and the need for a large-scale prospective research study, while the other report (Fylan *et al.*, 2005b) highlighted the role of changing drivers' perceptions of themselves as a speeding driver (self-identity), and for drivers to formulate and rehearse their reactions and behavioural responses to specific situations in which they might speed. Summaries of the reviews are presented first, and the combined conclusions in Section 4.3.

4.1 Social cognitive model review

This review has considered the research on seven different SCMs:

- the Theory of Reasoned Action/Theory of Planned Behaviour (TRA/TPB);
- the Health Belief Model (HBM);
- the Protection Motivation Theory (PMT);
- the Social Cognitive Theory (SCT);
- implementation intentions;
- the Transtheoretical Model of Change (TTM); and
- the Health Action Process Approach (HAPA).

The aim was to identify the model or components from these models that might most appropriately form the basis of interventions to change speeding behaviour. This has mainly been achieved through examining the power of these different models in predicting behaviour and the power of interventions based on these models in changing behaviour. See Conner *et al.* (2005) for full details of the methodology and for a full report of the results.

4.1.1 Theory of Reasoned Action/Planned Behaviour

Overall, 41 papers were identified that targeted a range of behaviours, including sexual behaviours, dietary behaviours, oral health behaviours, smoking behaviours, and safety and risk behaviours such as road crossing among adolescents and helmet wearing amongst bicycle-riding adolescents. The studies targeted a range of populations, including school children, university students, mothers, members of a workforce and the general public. Written or brief interventions were those which

typically provided a persuasive booklet or lecture to respondents. Media interventions aimed to change behaviour primarily through media channels using paid advertisements. Multi-session interventions delivered the intervention message in a number of sessions which could range in length from a few days to a few months. Studies were described as completely effective if they successfully changed all indicators related to the construct in question.

Ten interventions were found to be completely effective and a further six were partially effective. Six of these used written or brief interventions. For example, Quine *et al.* (2001) developed a persuasive booklet aimed at increasing helmet use amongst school-age cyclists. The booklet targeted attitudes, subjective norms and PBC. Respondents completed the booklet individually and then elaborated on the messages contained through group interaction. A control group received a similar booklet on bicycle proficiency and maintenance. At the five months follow-up they found that 25% of the intervention group had started to wear a helmet ($n = 12$) compared with none in the control group. Several other brief interventions employed implementation intentions (e.g. Sheeran and Silverman, 2003) and were generally found to have a medium effect size. Three interventions were multi-session interventions.

Overall, 16 interventions reported some level of effectiveness in changing behaviour but many of these changes were small. Six multi-session interventions were found to be partially or completely effective, and two were found to be ineffective. It is impossible to ascertain which techniques used in multi-component interventions are instrumental in achieving change and which are ineffectual. In terms of brief, written or media-based interventions, it is slightly easier to conclude what might make an effective intervention. Repeated media announcements may have an effect if a specific message is targeted. Printed interventions may also be effective at changing behaviour if they encourage the formation of implementation intentions, or encourage the elaboration of persuasive messages.

The available evidence shows that all the ineffective interventions were based on brief written booklets or simple lectures. This suggests that the simple presentation of persuasive material is not effective in changing intentions. In comparison, interventions which encourage elaboration of briefly presented persuasive material, either through group interaction (Quine *et al.*, 2001;), self-monitoring (Kelley and Abraham, 2004) or repeated exposure (Booth-Butterfield and Reger, 2004; Reger *et al.*, 2002) did appear to increase intentions, albeit moderately. It can be tentatively concluded that elaboration is the key to changing cognition and motivation in the context of brief interventions, however, future research should investigate this directly.

4.1.2 Health Belief Model

We identified 30 interventions, including breast self-examination, encouraging safe sexual behaviours, reducing smoking, and promoting healthy dietary behaviours. Intervention styles ranged from simple reminder cards and pamphlets to educational presentations in classes or workshops, individually tailored counselling and national television programmes. The majority of the interventions were successful, and those that were not used questionable evaluation, did not fully address all the model components or used written materials that may not have been read by the participants. Our review suggests that neither information nor HBM-based belief change interventions alone are sufficient to change the behaviour in question. A combination of the two, on the other hand, produced a four-fold increase in adherence.

Despite the success of many HBM interventions, there are a number of caveats. Effect sizes, where they can be calculated, are modest. The range of behaviours examined is relatively small. There is a lack of evidence about how best to change the components of the HBM. Finally, the methods of evaluation employed are generally weak. In conclusion, based on current HBM intervention studies, it is somewhat difficult to pinpoint a specific series of belief-changing techniques that are likely to prove effective. An examination of the unsuccessful interventions, however, would suggest that interventions containing only written material, or that piece different behaviours together, are ineffective. Given that previous meta-analyses (Harrison *et al.*, 1992; Janz and Becker, 1984) have found the barriers component to have the highest average correlation with health behaviour, interventions which omit this important component (e.g. Schmitz *et al.*, 1999) are also best avoided. It is also worth noting the similarity of barriers to self-efficacy (which is found to be such a powerful predictor in other models).

4.1.3 Protection Motivation Theory

As Milne *et al.* (2000) note, it is possible to distinguish between two types of PMT intervention studies:

1. 'health education' interventions that are broadly based on PMT; and
2. experimental manipulations of specific PMT variables.

In health education interventions, the intervention group receives information about a health threat and recommended action, whereas the control group receives information on an unrelated topic or receives no information. The health education intervention typically provides general factual information on the health threat and an appropriate coping response based on PMT constructs. For example, in an intervention to encourage participation in mammography screening (Boer and Seydel, 1996), women in the intervention group were sent a PMT-based leaflet entitled *Breast Examination* that described the relative high vulnerability of older

women to breast cancer and the high response efficacy of mammography screening. Feelings of self-efficacy towards participating in the screening programme were encouraged by explaining that mammography is a straightforward procedure with little discomfort. Three days after receiving the leaflet, the women received a PMT questionnaire. The women in the control group received no information, simply receiving the PMT questionnaire.

Other studies have directly manipulated specific PMT variables. In these studies participants typically read a persuasive communication in which specific PMT variables have been independently manipulated prior to their measurement in a PMT questionnaire. Most of these studies seek to manipulate specific PMT variables through the presentation of information designed to produce high versus low levels of the targeted construct. For example, participants in one condition may receive information designed to increase perceptions of vulnerability whereas participants in the other condition may receive information designed to decrease perceived vulnerability.

Unusually, in this area, PMT interventions have been subject to a quantitative review. Milne *et al.* (2000) assessed the impact of PMT interventions through a meta-analysis of cognition changes following experimental manipulations of specific PMT variables. Their meta-analysis consisted of eight studies that included specific manipulations of PMT constructs and that considered the effects of the manipulations on corresponding PMT cognitions. Manipulations of the threat appraisal variables led to significant changes in corresponding perceptions of severity and vulnerability. The effect sizes are large. The effect sizes for manipulations of response efficacy and self-efficacy, though smaller, were significant and in the medium-to-large range. Only manipulations of response costs were unable to produce a significant effect. It is noteworthy that the experimental manipulations tend to be more successful at changing threat than coping appraisal cognitions.

Unfortunately, Milne *et al.* (2000) did not consider the impact of PMT interventions on protection motivation (i.e. intention) and behaviour. Considering the impact of manipulating specific PMT variables, the largest number of studies have focused on exercise. For example, Courneya and Hellsten (2001) presented students with essays that manipulated each of the four main PMT constructs. Only the perceived severity manipulation was found to have a significant effect on exercise intentions. However, most other studies have reported significant effects for self-efficacy manipulations on exercise intentions (e.g. Fruin *et al.*, 1992), and significant effects have also been reported for perceived vulnerability (Wurtele and Maddux, 1987) and response efficacy (Stanley and Maddux, 1986) manipulations. Only a small number of experimental studies have focused on other health behaviours. For example, Stainback and Rogers (1983) presented high versus low threat information to high-school students which was found to influence intentions to remain abstinent and not to drink and drive.

It is clear that the majority of application and intervention studies based on PMT have investigated the adoption of health-promoting behaviours (e.g. screening, exercise, adherence to medication) rather than the cessation or reduction of risky behaviours (e.g. binge-drinking and smoking). In fact, to date, there have been only three published studies in which PMT has been applied to risky behaviours in adults. These provide evidence that self-efficacy is an important predictor of **intention**, but it is not clear whether this translates into **behaviour**. Moreover, there are only a few interventions based on PMT that target risk behaviours amongst adults and so strong claims about the efficacy of PMT-based interventions for these behaviours are difficult to make. Maddux and Rogers (1983) found that manipulations of response efficacy and self-efficacy had significant effects on intentions to quit smoking. The study by Greening and Stoppelbein (2000) is encouraging and suggests a role for self-efficacy and rewards associated with the maladaptive behaviour. A recent study in which the PMT was used to make predictions about the impact of messages within anti-smoking campaigns (Pechmann *et al.*, 2003) is also interesting, suggesting that risks other than those associated with health may be important for some populations. Those messages that enhanced adolescents' perceptions that smoking resulted in social disapproval were the most effective in increasing non-smoking intentions.

In summary, there is support for a role of threat appraisal variables (i.e. perceived severity and vulnerability) and a greater role of coping appraisal variables (i.e. perceived response efficacy, self-efficacy and response costs) in predicting protection motivation and, to a lesser extent, behaviour. Interventions based on PMT have been somewhat successful in changing intentions, and when these changes do occur they appear to be due to changes in the relevant cognitions. However, evidence that PMT is a successful model for behaviour change is still weak and further studies of these relationships and, specifically, for risk behaviours are needed before any strong claims can be made about the efficacy of PMT as a basis for reducing speeding.

4.1.4 *Social Cognitive Theory*

We located 39 intervention studies that were based on SCT to various degrees. There are many problems inherent in comparing the efficacy of interventions, including the fact that studies target different components of SCT in different ways, and frequently include components from other models. A range of behaviours was examined, including safer sex, exercise, diet, alcohol use, smoking, drug use, and driving (e.g. Newman *et al.*, 1992). Twenty-four of the 32 studies (75%) that included behaviour as an outcome measure reported evidence of behaviour change following SCT-based interventions. However, the wide range of content, style, theoretical basis and behaviours involved in the interventions makes it difficult to pinpoint which of the specific SCT components or interventions are the most effective at promoting behaviour change. The interventions generally included a combination of approaches. Most of the interventions included an educational

component, which ranged from lectures and group demonstrations to one-to-one sessions. Other interventions included social support enhancement, goal setting, self-monitoring, role play and group work. Tailored interventions were administered in at least five studies. One of the more innovative interventions was that by Winkleby *et al.* (2004). In this intervention school children critically analysed the content of tobacco advertisements designed to promote smoking amongst teenagers. Participants were encouraged to discourage their peers from smoking, and they also carried out activities in the community aimed at reducing the amount of tobacco advertising that could be seen by children, they discussed tobacco funding with council representatives, and increased stores' compliance with the laws regarding the selling of cigarettes to minors. Although there was no significant impact in terms of overall smoking, the intervention did reduce smoking amongst regular smokers.

Most of the interventions also included a skill enhancement or self-efficacy bolstering component. According to Bandura (1997), self-efficacy can be enhanced through personal mastery and vicarious experience, with personal mastery being the most effective, since it provides personalised information regarding goal attainment. Such interventions provide participants with opportunities to gain experience relevant to the skills necessary to carry out a behaviour. Lawrence *et al.* (1997), for example, gave female prison inmates the opportunity to practise condom application skills and found that participants subsequently demonstrated greater skill in this area. Vicarious experience is gained through modelling (i.e. observing others performing a difficult behaviour). This approach was employed in six of the interventions and all showed significant changes in the desired direction. Interventions that fail to include mastery experience (cf. Schmoll and Zimmerman, 2001) may improve outcome expectancies without changing self-efficacy or behaviour. Such interventions do not present individuals with the opportunity to experience potential barriers during the intervention and to learn techniques to deal with them. If they are later faced with such barriers, they might fail and subsequently develop low expectances regarding their own abilities. Computerised interventions have been employed in order to expose individuals to vicarious and mastery experience.

Five components identified by Bandura (2000), and included in SCT, that are thought to be particularly important in terms of adopting health behaviours are:

- provision of information;
- skill mastery;
- self-efficacy for skill implementation;
- social competence; and
- social support.

In light of these suggestions Lawrence *et al.* (1997) designed an HIV intervention incorporating:

- an educational component;
- a component aimed at rehearsing skills targeting social competence, such as how to negotiate with a partner or refuse suggestions;
- self-protective skills, such as condom application and needle bleaching;
- fostering social support; and
- creating a social norm of self-protection.

At the follow-up, participants reported improved self-efficacy, more frequent communication about condom use, increased knowledge about AIDS, and improved condom-application skills. These changes were still apparent at a follow-up period of six months.

Individually tailored, one-to-one interventions (e.g. Cook *et al.*, 2003) based on SCT may, however, be more effective and lead to better maintenance than non-tailored interventions. Encouraging behaviours via SCT variables could, perhaps, better be accomplished by improving self-efficacy and discussing the benefits and barriers to the behaviour in question.

Interventions based on SCT have a fairly impressive success rate, but perhaps their most valuable contribution has been to draw attention to the importance of considering self-efficacy. There is now a strong evidence base that suggests focusing interventions of self-efficacy is an effective strategy (Bandura, 2000). The majority of studies in this area measure self-efficacy and behaviour pre- and post-intervention, and they are mainly concerned with how self-efficacy impacts directly upon behaviour. There is a need for more research to differentiate the effects of mastery-enhancing experience and vicarious learning. Interventions that offer a combination of mastery enhancement (through honing skills and presenting participants with potential barriers which they may need to overcome in the future) and 'testimonials', such as those offered by Kinsler *et al.* (2004), may prove the most effective.

4.1.5 *Implementation intentions*

Eighteen published papers were identified. The standard design of studies in this area is one in which participants complete a questionnaire in which constructs from theories (usually TPB or PMT) are measured and where an intervention in the form of a brief statement requesting the participant to form an implementation intention is appended to the end of the questionnaire for those participants randomly assigned to the implementation intention condition. The participant is often asked to give some details of this plan.

Five studies have examined the impact of implementation intentions on exercise behaviour, mainly in student populations. The research suggests that difficult goals, such as increasing exercise, may only be achieved by boosts to motivation as well as specific plans with both a motivational and planning component. A series of studies have also examined dietary changes, self-examinations and screening, pill intake, avoiding risky health behaviours, and attending health and safety courses. There is strong evidence across these studies suggesting that implementation intentions are effective in moving people towards achieving their goals. Fourteen of the 18 studies reviewed found significant effects for implementation intentions either alone or in combination with a motivational intervention. However, these findings, although impressive, must be treated with caution as most have involved student samples who may participate in studies for very different reasons (e.g. course credits) from those people for whom interventions are often designed (e.g. speeding drivers). Where non-student samples have been employed, the findings have been more mixed and the effects, if any, smaller.

The overall impact of implementation intentions on behavioural performance and goal achievement has been tested in two meta-analyses (Koestner *et al.*, 2002; Sheeran, 2002). Implementation intentions have a medium effect size on behavioural enactment and goal attainment. Thus, forming an implementation intention makes an important difference to whether or not desired outcomes are obtained compared to the formation of a goal intention on its own. However, effective implementation intentions do require high levels of goal intentions. Thus, if they were to be employed in relation to speeding behaviours, it would require either focusing on a group with strong goal intentions or the combining of implementation intentions with a motivational intervention designed to increase goal intentions. Moreover, it is not yet clear whether implementation intentions are an effective way of producing change across different types of health behaviour; for example easy and difficult (such as taking pills versus regular exercise) and infrequent versus repeated behaviours (such as mammography testing versus eating healthily). The evidence suggests that implementation intentions are effective for one-off and more difficult behaviours, particularly when combined with a motivational intervention. There is mixed evidence that implementation intentions are effective when the aim is to reduce or stop the occurrence of a behaviour altogether.

In summary, implementation intentions offer the possibility of a cheap and effective strategy for producing behaviour change, but the body of methodologically strong, field-based studies is not yet large enough to provide convincing evidence that they would be an effective strategy for changing risky behaviours such as speeding.

4.1.6 *Transtheoretical Model of Change*

Although there are a large number of intervention studies which claim to be based on the TTM, in reality there are actually few. The strongest evidence for a stage

theory would be to show, consistently, in randomised experimental studies, that stage-matched interventions are more effective than stage-mismatched interventions in moving people to the next stage in the sequence (Sutton, 2005). Blissmer and McAuley (2002) studied physical activity. Two-hundred and twenty-eight university staff were randomly assigned to four conditions, including:

- stage-matched materials provided on a monthly basis; and
- stage-mismatched materials, also delivered monthly.

After 16 weeks, 40% of the matched group had progressed one or more stages compared with 32% of the mismatched group. This difference was in the predicted direction but was non-significant. The other two experimental studies of matched and mismatched interventions found little or no evidence for the stage model predictions (Sutton, 2005). The TTM has been very influential and has popularised the idea that behaviour change involves movement through a series of discrete stages. It has also stimulated the development of innovative interventions. However, as Sutton (2005) concludes, the model cannot be recommended in its present form. Not only are there fundamental problems with the definition and measurement of the stages (see Sutton, 2005) but the large body of literature on the TTM provides little supportive evidence. Clearer predictions from the model need to be specified and tested using strong research designs: longitudinal studies of stage transitions with short time intervals and experimental studies of matched and mismatched interventions (Weinstein *et al.*, 1998).

4.1.7 *Health Action Process Approach*

Only three recent intervention studies based on the HAPA were identified. Each examined the effect of brief interventions designed to encourage the formation of detailed plans with respect to future behaviour, and each produced modest impacts on behaviour change. For example, in a study on breast self-examination (BSE), Luszczynska (2004) evaluated the effectiveness of a single-session intervention designed to enhance pre-action and maintenance self-efficacy and positive outcome expectancies in a sample of 417 students in Poland. The intervention consisted of several components, including a film showing a woman performing BSE, practise with a silicone model of a breast, and a leaflet. Relative to the no-intervention control condition, the intervention significantly increased pre-action self-efficacy and outcome expectancies (but not maintenance self-efficacy), and led to a significant increase in the frequency of BSE 12 -15 weeks later. In relation to designing a course to change driving behaviour, the HAPA, as yet, does not provide compelling evidence about the target and the nature of the interventions that are likely to be successful.

4.1.8 Conclusion: the practicality of social cognition models

Social cognition models can be used to inform the development of interventions to change health behaviour (Norman and Conner, 2005). Brawley (1993) argues that it is possible to assess the extent to which a model provides a sound framework for intervention design on the basis of its **practicality**. To have a high level of practicality a model must:

- have predictive utility;
- describe the relationships between key constructs;
- offer guidelines for the assessment of these constructs;
- allow the translation of these constructs into operational manipulations; and
- provide the basis for detecting the reasons why an intervention succeeds or fails.

Each of these factors are considered in turn in relation to the seven SCMs reviewed. Implementation intentions do not fit easily into such a framework, appearing to be more like an intervention (see below).

First, it is clear that many of the models have good predictive utility and, as such, provide a sound basis for developing interventions. TPB studies indicate that intentions, PBC and attitudes have medium-to-strong impacts on behaviour. Similar results have been reported in relation to PMT, and the self-efficacy construct of SCT. In contrast, the HBM and TTM have received less empirical support. Overall, considering the predictive utility of SCMs, it is clear that the TPB, PMT and SCT are likely to provide good frameworks for the development of effective interventions, whereas the empirical basis for the practicality of the HBM, TTM and HAPA is less well established.

Second, models should describe the relationships between key constructs. Overall, the TPB, PMT and SCT appear to provide sound frameworks for intervention design as they describe the relationships between key constructs, whereas the HBM and TTM require further model specification.

Third, a model should provide guidelines for the assessment of key constructs. This criterion appears to be met by all the models considered, although the TPB, SCT and the TTM stand out inasmuch as detailed guidelines have been provided by the models' authors.

Fourth, it should be possible to design interventions to change these constructs. However, a common critique of the major SCMs is that, while they can be used to identify the key beliefs for interventions to focus on, they provide few guidelines on how to change these beliefs (Norman and Conner, 2005). Given the cognitive nature of these models, most theory-based intervention studies use the presentation of persuasive messages to attempt to change beliefs (Hardeman *et al.*, 2002). However,

as Eagly and Chaiken (1993; p. 240) highlight in relation to the TPB, there is 'no formal guidance for choosing arguments to include in messages designed to influence a specific belief'. Instead, it is necessary to look to models of attitude change, such as the elaboration likelihood model (ELM; Petty and Cacioppo, 1986), which proposes that attitude change is dependent on message favourability and elaboration (for an example study see Quine *et al.*, 2001). An exception to this critique of SCMs is SCT. Bandura (2000) outlines various sources of self-efficacy that can be targeted to enhance self-efficacy. First, self-efficacy can be enhanced through personal mastery experience, for example splitting a target behaviour into various sub-behaviours which can be mastered in turn. Second, self-efficacy can be enhanced through vicarious experience, i.e. from observing a person successfully perform the behaviour. Third, persuasive communications can be used, for example in leaflets, to enhance self-efficacy. Finally, physiological feedback that is compatible with the successful performance of the behaviour can also be used to enhance self-efficacy. Encouragingly, interventions encompassing the above suggestions have been found to increase the performance of health behaviour. Other models also provide theory-based intervention techniques. In particular, the formation of implementation intentions specifying when, where and how a behaviour is to be performed is a powerful volitional technique for ensuring that goal intentions are translated into behaviour.

Fifth, a model should provide a basis for detecting the reasons why an intervention succeeds or fails. It is clear that the major SCMs have the potential to provide such an account and it is difficult to distinguish models on this basis. However, intervention studies generally do not report such analyses.

The SCMs reviewed here satisfy many of the criteria put forward by Brawley (1993) for assessing the practicality of a model. As a result, they should provide a good basis for the development of interventions to change health behaviour. The TPB, SCT and PMT probably have the best evidence for practicality. However, evidence for the utility of interventions based on these models is mixed. There are various reasons for this mixed pattern of results, for example both the HBM and TTM have been found to have limited predictive utility and lack model specification. In addition, most of the models fail to specify how to manipulate key constructs. Most theory-based interventions simply use the presentation of persuasive messages to attempt to change beliefs and behaviour. However, there are a range of behaviour change techniques that could be utilised. Hardeman *et al.* (2000) identified 19 such techniques in behaviour change programmes to prevent weight gain that were classified according to the four 'fundamental intervention activities' identified by Kalichman and Hospers (1997). First is instruction, in which individuals are provided with explanations and rationales for adopting the target behaviour (i.e. persuasive messages). Second is modelling, in which a credible model is seen to successfully perform the target behaviour. Third is practice, or mastery experience, which may be achieved through the use of role plays. Fourth is feedback, in which practitioners and peers provide support and encouragement to reinforce behaviour

change. Unfortunately there were insufficient studies to allow us to identify which type of intervention works best with which model.

4.1.9 Which variables to target in interventions?

An alternative approach to identifying which model to focus on is to try to identify which variables to target in interventions. Tables 1.1 and 1.2 (see Section 1.8) usefully summarise the effect sizes from reviews of applications of the literature. This would suggest the value of targeting intentions, PBC/self-efficacy, attitudes, outcome expectancies, response costs and barriers. However, it is worth reiterating that, in general, the evidence about how to intervene to change these variables is modest. The power of intentions to predict behaviour might be directly targeted through interventions promoting planning or perhaps the formation of implementation intentions. Attitudes, response costs, barriers and outcome expectancies/response efficacy are typically targeted through persuasive messages. Our review of interventions would appear to suggest that such persuasive messages need to be paired with strategies that promote elaboration (e.g. group discussion) in order to be effective. In relation to outcome expectancies, our own research (Lawton *et al.*, in press) has identified that affective beliefs are more important predictors of self-reported and actual speeding behaviour (recorded via a speed camera) than cognitive beliefs. There is also evidence from our review of speeding (see Chapter 3) that the benefits associated with speeding (e.g. reaching a destination more quickly) may be as, if not more, important than the risks associated with speeding in predicting self-reported intentions and behaviour. These might form useful targets for intervention designed to change speeding and unsafe driving.

One area where the evidence about how to intervene is better is in relation to self-efficacy. Bandura (1991) has outlined four main sources of self-efficacy that could be targeted in interventions. Our review of speeding research indicated that PBC/ self-efficacy may be an important area for intervention.

4.1.10 Which interventions are particularly effective?

Our conclusions from the review of effective interventions are somewhat weaker. In general, there are insufficient well-designed and evaluated interventions within each model on which to base firm conclusions and recommendations. An exception is in relation to implementation intentions, where a number of well-designed and evaluated interventions are to be found, indicating a medium effect size of such interventions. However, even here the long-term effects have not been studied. Another conclusion from the intervention studies is that persuasive materials tend to be more effective when combined with an intervention that promotes the elaboration of the messages.